News about

B. F. Goodrich Chemical *raw materials*

Improve and save on your rubber processing with Good-rite Vultrol

® REG. U. S. PAT. OFF.

Vultrol

...PROTECTS AGAINST SCORCHING
...PERMITS UNINTERRUPTED PRODUCTION
...REDUCES "DEAD" STOCKS
...REQUIRES NO SPECIAL HANDLING

Good-rite Vultrol offers you many advantages for rubber processing. It is ideal for preventing scorching not only during the hot weather months—but the year round. It retards scorch at processing temperatures, and also acts as a mild activator at curing temperatures.

Check these additional Vultrol advantages. It is beneficial on heavy-loaded or highly-accelerated compounds, and is particularly effective with high abrasion furnace blacks.

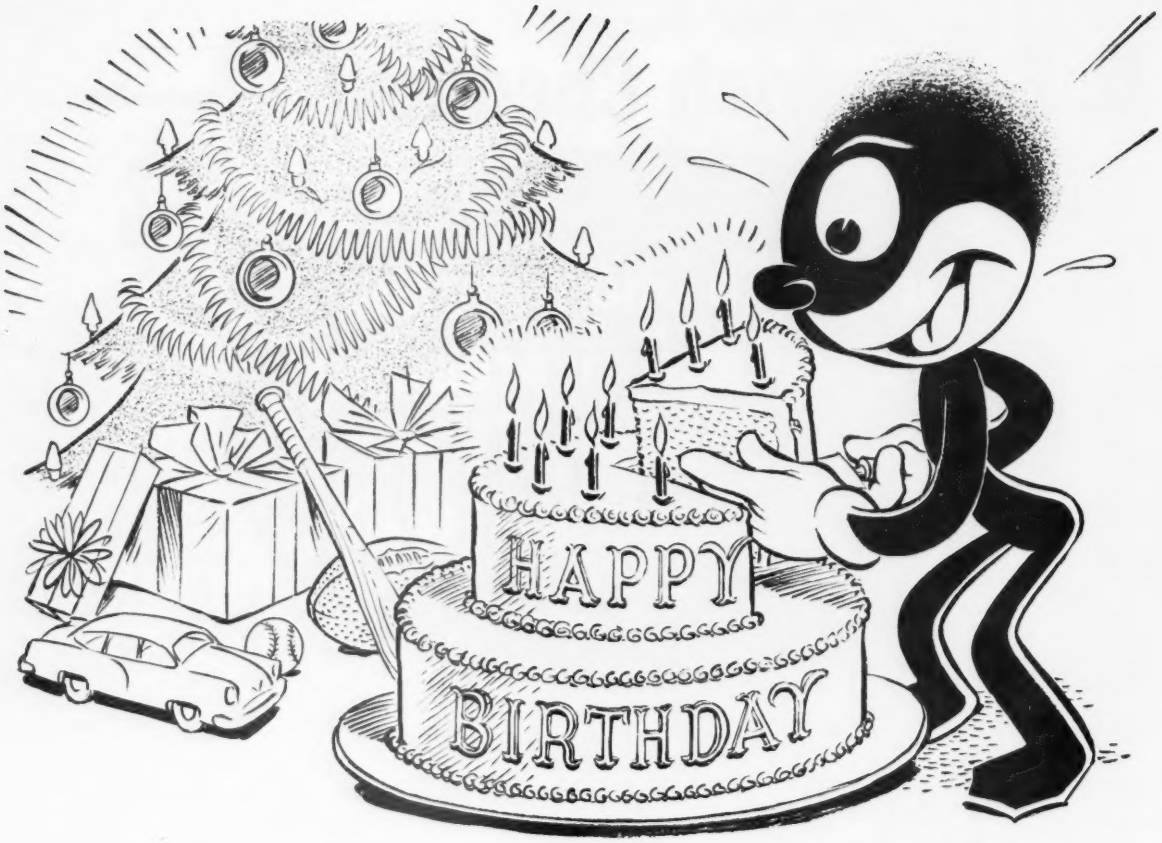
Supplied as a free-flowing flake, Vultrol requires no special handling. It is most effective when added to the latter stages of mixing. Economical and easy to use. Saves time, money and labor! For further information about Good-rite Vultrol, please write Dept. HB-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Good-rite *Rubber Chemicals*

®G. U. S. Pat. Off.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



First oil furnace black—**Philblack* A**
is 10 years old on Christmas Day!

Goodness gracious, how this baby has grown! Phillips research made possible, in 1943, the first oil furnace black. And Philblack A, and his brothers O, E, and I, have been making tremendous strides ever since! Today, all over this country and abroad, too, the Philblacks are being used to make better rubber products, more reasonably and more easily than was ever possible before!

Philblack A is specially renowned for easy processing; smooth, fast extrusions; accurate moldings! For information about the whole famous Philblack family, consult our technical sales representative or write our nearest office.

PHILLIPS CHEMICAL COMPANY

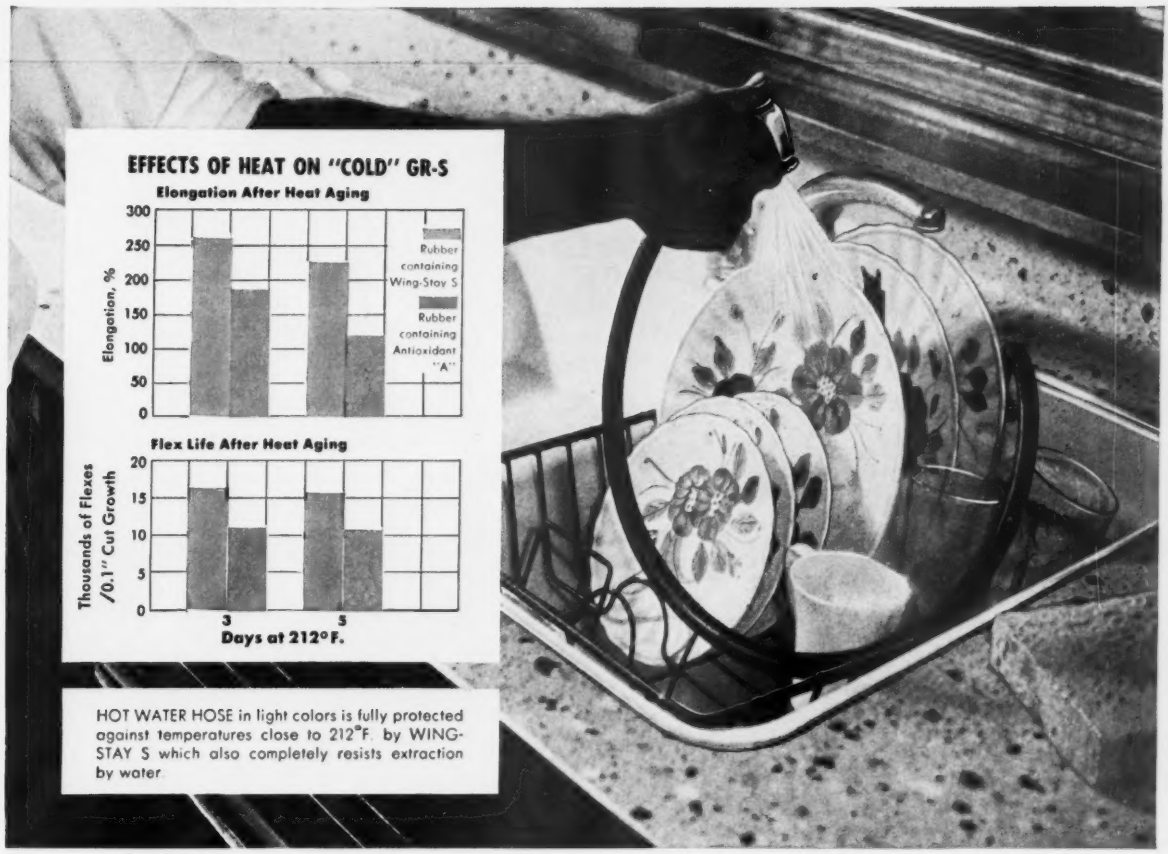
PHILBLACK SALES DIVISION

318 WATER STREET · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION · 80 BROADWAY · NEW YORK 5, N. Y.

* A Trademark

The Philblacks are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago, and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.



TO BEAT THE HEAT

protect rubber with *Wing-Stay S*

BEST way to beat the heat in its attack on rubber is with WING-STAY S – today's outstanding, nonstaining, non-discoloring antioxidant.

WING-STAY S is a liquid phenol styrene copolymer. It readily gives up hydrogen to "tie up" oxygen absorbed from the air. It resists heat, sunlight and extraction by water. It protects both natural and synthetic rubbers without odor, migration or discoloration.

WING-STAY S is widely used to protect GR-S. It is easily incorporated in both dry rubbers and latices. Try it in your present compound–nitrile or chloroprene rubbers excepted. Subject it to heat aging and sunlight exposure tests. You'll soon see that WING-STAY S offers the best balance of permanent protection, non-discoloring properties and low cost. For details, write to:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL
GOODYEAR
DIVISION

We think you'll like "THE GREATEST STORY EVER TOLD"–every Sunday–ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE–every other Sunday–NBC TV Network

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic, Wing-Stay–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products—CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS—The Finest Chemicals for Industry

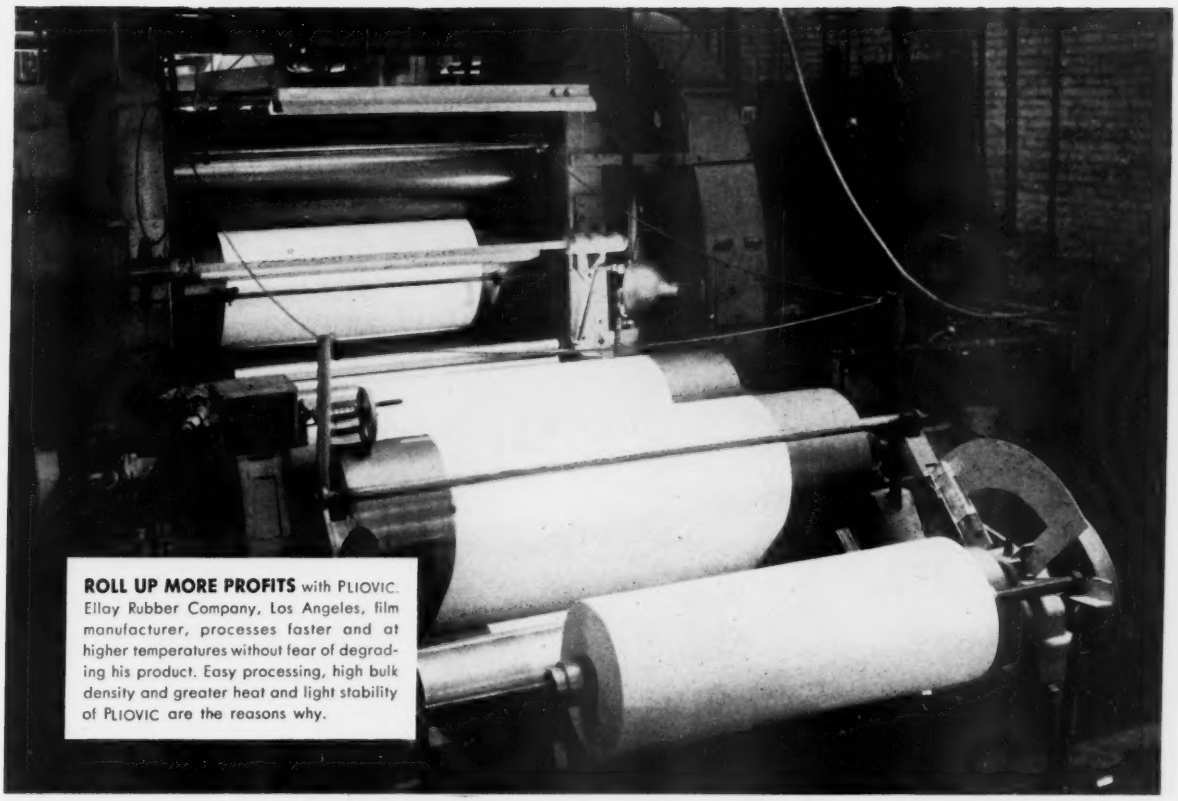
NOTHING CHANGES BUT THE NAME!

ADM was the first company to produce hydrogenated fatty acids in commercial quantities for the rubber industry. For many years, however, ADM Rubber-Grade Stearic Acid has been distributed widely under a private label by a supplier of rubber chemicals.

Effective January 1, 1954, the *same* identical product, under the trade name HYDROFOL ACIDS 51 R. G., will be distributed directly by the Chemical Division of Archer-Daniels-Midland Company and its nationwide chain of sales offices and agents.

GET QUALITY CONTROL ... WITH HYDROFOL ... *Produced in any Quantity from SAMPLES to SHIPLOADS*

ARCHER • DANIELS • MIDLAND COMPANY
Chemical Products Division • 2191 West 110th St. • Cleveland 2, Ohio



ROLL UP MORE PROFITS with PLIOVIC. Elloy Rubber Company, Los Angeles, film manufacturer, processes faster and at higher temperatures without fear of degrading his product. Easy processing, high bulk density and greater heat and light stability of PLIOVIC are the reasons why.

Another Film Maker Reports—

FASTER PROCESSING with PLIOVIC

FASTER processing. Higher permissible calender speeds. Easier handling. Less storage space required. Higher quality in the finished film. These are the results of this West Coast manufacturer's use of PLIOVIC.

PLIOVIC is a straight p.v.c. resin of medium to high molecular weight. Its polymerization is carefully controlled to give an easy processing resin without sacrifice of physical properties. High bulk density and excellent resistance to heat and light are its other major features.

These properties of PLIOVIC add up to greater throughput of quality products at lower cost.

Whether you calender, extrude or mold, you'll find it pays to put this unusual resin in your plant. The full story on PLIOVIC—in the form of a new, technical manual—is yours for the asking. Just write to:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products—CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS—The Finest Chemicals for Industry

FOR THE PRECISION MOLDING OF RUBBER PRODUCTS

THIS Erie Foundry Company 800 Ton Precision Hydraulic Press is designed and built to close tolerances. A number of these special presses purchased by one of the nation's largest rubber processors, are required in precision molding of special rubber products. Your specifications for precision presses are in capable hands when you send them to Erie Foundry Company. A half century of engineering and craftsmanship is at your command. Write for bulletin 350.

ERIE FOUNDRY COMPANY HYDRAULIC PRESSES

ERIE FOUNDRY COMPANY • ERIE, PA., U.S.A.

DETROIT 335 Curtis Building • CHICAGO 13 South Austin Blvd. • INDIANAPOLIS 2302 N. Meridian Street • NEW ENGLAND G. V. Eads, Kent, Conn.

LOS ANGELES 2505 Santa Fe Avenue • PHILADELPHIA Girard Associates 42 North 52nd Street • SAN FRANCISCO 2070 Bryant Street

RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting

Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured

Gang Dies Our Specialty

- **Accuracy to close Tolerances**
- **Durability**
- **Genuine Understanding of the problems of rubber goods manufacturers**

MALLET HANDLE DIES

PURPOSE — For those who have no machinery and do not wish to purchase any. For Cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from bolts or not.

SERVICE—One to three days.

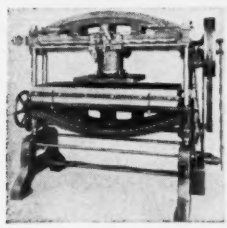
STEEL RULE CUTTING DIES

Used on Die Cutting Press, Printing Press or Power Press

PURPOSE — Especially suited for cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE—Low in cost. Suitable for long production runs. It is necessary to cut from rectangular sheets which are fed into the press.

SERVICE—One day service.



STEEL RULE CLICKER DIES

Use On Clicker Machine or Dinker Press

PURPOSE—For Cutting Rubber, Neoprene, Plastics, etc.

ADVANTAGE — More reasonably priced than the all steel dies. Recommended for small and medium quantities where cost of an all steel die is not warranted.

SERVICE—One day service.

ALL STEEL DIES

Use On Clicker Machine or Beam Press or Power Press

PURPOSE—For Cutting—Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from rolls without first cutting into sheets.

SERVICE—One to three day service on dies.

DIE CUTTING SERVICE

PURPOSE—For those who prefer to have their cutting done by others.

ADVANTAGE—We can die cut your product for you on our own presses rapidly and economically at a low "per thousand" cost.

SERVICE—One to three days.

Dies for cutting
Gaskets, flashing from molded parts, rubber soles, foam and sponge for furniture padding, inflated toys, clothing and footwear, etc.

SAME DAY SERVICE

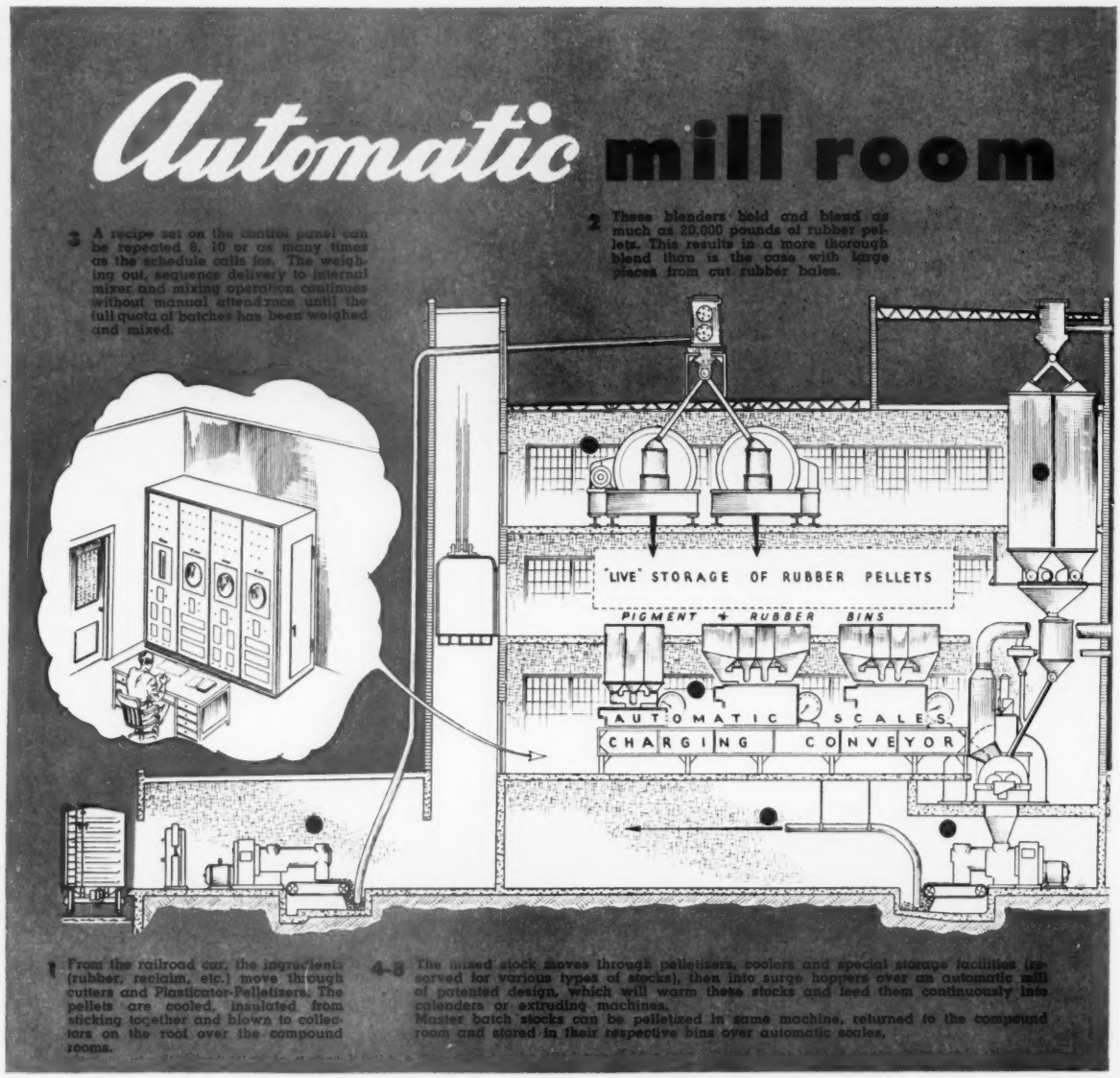
ACCURATE

STEEL RULE DIE MANUFACTURERS

24-28 West 21st Street, New York 10, N. Y. CHelsea 2-0860-1

Subsidiaries: American Fabricators; Interstate Die Cutting Co., Inc.

Intelligent Service to the Rubber Goods Industry for Over 22 Years


Automatic mill room
3 A recipe set on the control panel can be repeated 8, 10 or as many times as the schedule calls for. The weighing out, sequence delivery to internal mixer and mixing operation continues without manual attendance until the full quota of batches has been weighed and mixed.
2 These blenders hold and blend as much as 20,000 pounds of rubber pellets. This results in a more thorough blend than is the case with large pieces from cut rubber bales.
"LIVE" STORAGE OF RUBBER PELLETS
PIGMENT + RUBBER BINS
AUTOMATIC SCALES
CHARGING CONVEYOR
1 From the railroad car, the ingredients (rubber, reclaim, etc.) move through cutters and Plasticator-Pelletizers. The pellets are cooled, insulated from sticking together and blown to collectors on the roof over the compound rooms.
4-5 The mixed stock moves through pelletizers, coolers and special storage facilities (reserved for various types of stocks), then into surge hoppers over an automatic scale of patented design, which will warm these stocks and feed them continuously into calenders or extruding machines.
Master batch stocks can be pelletized in same machine, returned to the compound room and stored in their respective bins over automatic scales.

IS THIS FOR ME? WHAT ARE THE ADVANTAGES?

Each succeeding batch or formula can be changed.

New techniques in controls make the change setting of scales as simple as tuning in different stations on your radio. Now, the low volume producer with many kinds of stocks can consider automatic compounding and mixing.

More pounds per hour through the mixing equipment.

If you have a Banbury, the manufacturer has told you how to reduce mixing time. To increase the batches through your Banbury per hour, it is necessary to eliminate the human element which now throttles production.

Automatic scales weigh and deliver ingredients to the Mixer in a few seconds time. Hand scoops, carving knives and hand-set scales are ancient tools. Program controllers operate the Mixer. Pelletizers convert the mixed stock into pellets, which are cooled and blown into special bins. ALL LABOR has been eliminated!

Extruding or Calendering on the "Heavy Side" No Longer Necessary.

Hundreds of thousands of dollars worth of material can be saved yearly by extruding or calendering exact lineal weights. The intimate blending of the raw material and the precise weighing of all ingredients guarantees uniform gravities and physical properties.

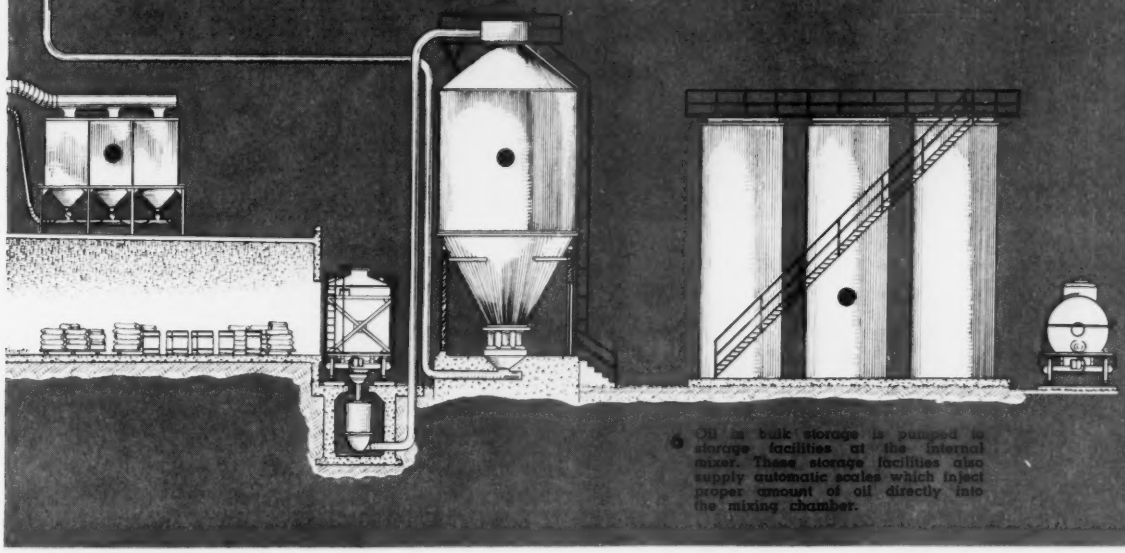
Automatic Weighing and Handling of Raw Materials and Mixed Stock

. . . from railway cars to calenders and extruders

5 Carbon Black, in Bulk Form, moves directly from railroad car to storage bin. By automatic control, black is dispatched to any one of a number of surge hoppers over the mixers. These in turn feed automatic scales which discharge the correct weight at proper rate directly into mixing chambers.

7 Dust from the mixing operation is collected continuously and returned to the Mixer for incorporation in the same batch from which it was originally taken.

In these two pages, we outline the specific advantages of an Automatic Mill Room. Hale and Kullgren is the first independent engineering firm to design such a plant. If you are interested in considering automation, Hale and Kullgren will survey your facilities and advise you on such factors as: savings; capital equipment needed; a recommended step-by-step program. Address your inquiry to: Hale and Kullgren, Inc., P.O. Box 1231, Akron, Ohio.



6 Oil in bulk storage is pumped to storage facilities at the internal mixer. These storage facilities also supply automatic scales which inject proper amount of oil directly into the mixing chamber.

NE

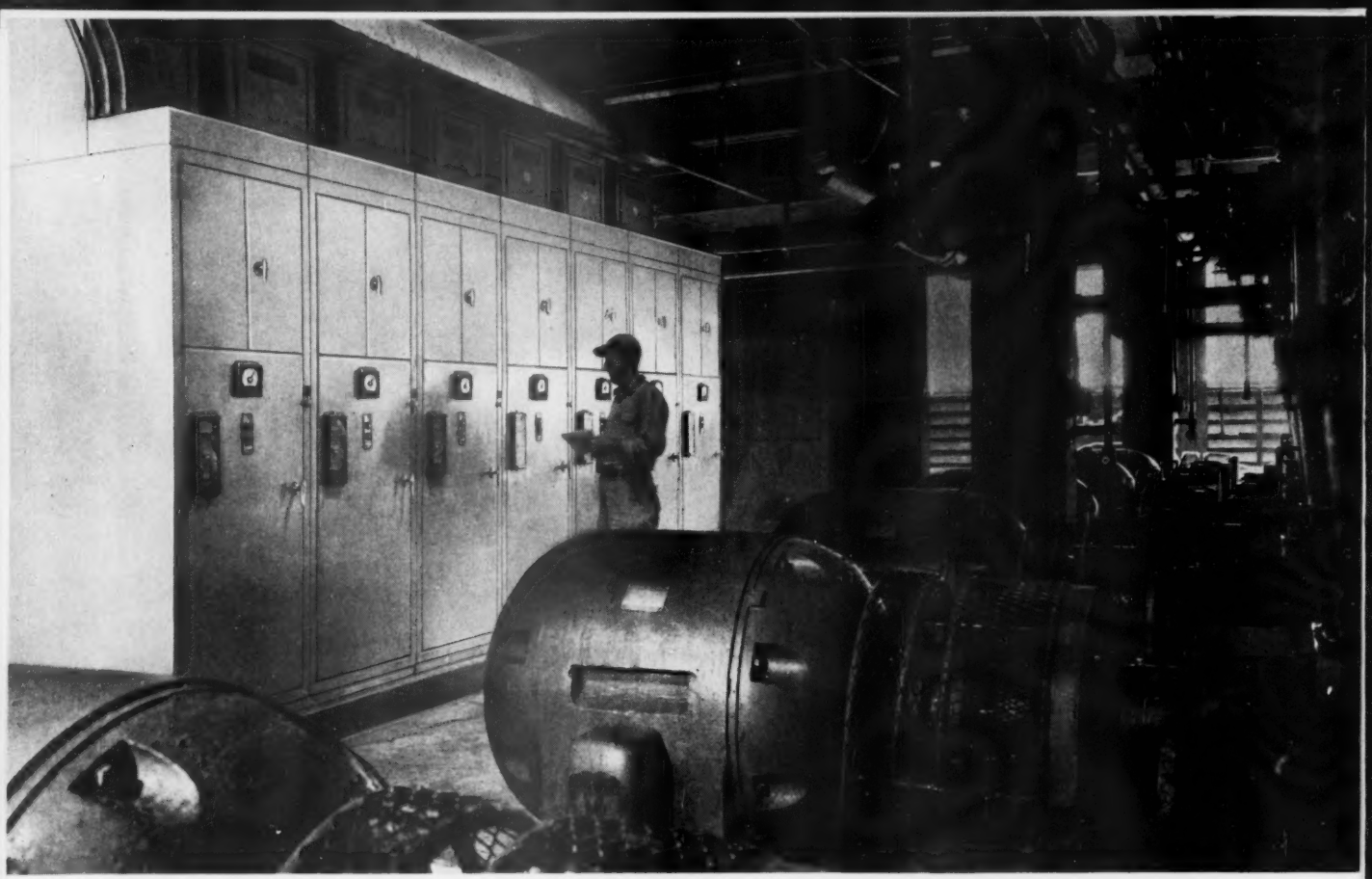
National Erie products for the Plastic and Rubber Industries • Extruders • Simplex Doors for Autoclaves • Mills and Hydraulic Presses.

This old and well-known line of machinery was acquired March 1, 1952, by The Aetna-Standard Engineering Company. They are manufactured in their Warren, Ohio and Ellwood City, Pa., plants. The sales and engineering of the National Erie line is the responsibility of Hale and Kullgren, Inc., Akron, Ohio.

COMPLETE SERVICE ON RUBBER & PLASTICS
a complete plant : a specialized process : an engineering service or individual machines

SALES AND ENGINEERING by
HALE AND KULLGREN INCORPORATED
P. O. BOX 1231 — AKRON, OHIO

MANUFACTURING by
Aetna-Standard
THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.
Plants in Warren, Ohio
Ellwood City, Penna.



G-E LIMITAMP controls the operation of high-voltage motor drives up to 2250 hp . . . gives you quick, silent protection for personnel and equipment against dangerous short-circuit conditions up to 250,000 kva . . . helps prevent costly shutdowns.

Safety for your personnel and equipment with high-voltage G-E Limitamp Control

Don't take chances with dangerous short-circuit conditions. G-E Limitamp Control protects against sudden electrical overloads . . . assures greater safety for your personnel and costly electrical equipment. A high-voltage motor control, G-E Limitamp Control provides interrupting capacity up to 250,000 kva.

MAINTENANCE PERSONNEL is guarded by a steel barrier separating high- and low-voltage compartments. A mechanical door interlock assures motor circuit interruption before the fuse compartment door can be opened.

GET EQUIPMENT PROTECTION with General Electric Type EJ-2 fuses which clear fault current in less than ¼ cycle, operate only under actual "short" conditions. Also, improved heavy-duty air-break contactors give you millions of operations.

FOR YOUR SPECIAL OPERATION individual components need not be specified. Let G-E application engineers select the correct components, give you the right interrupting capacity . . . better personnel and equipment safety.

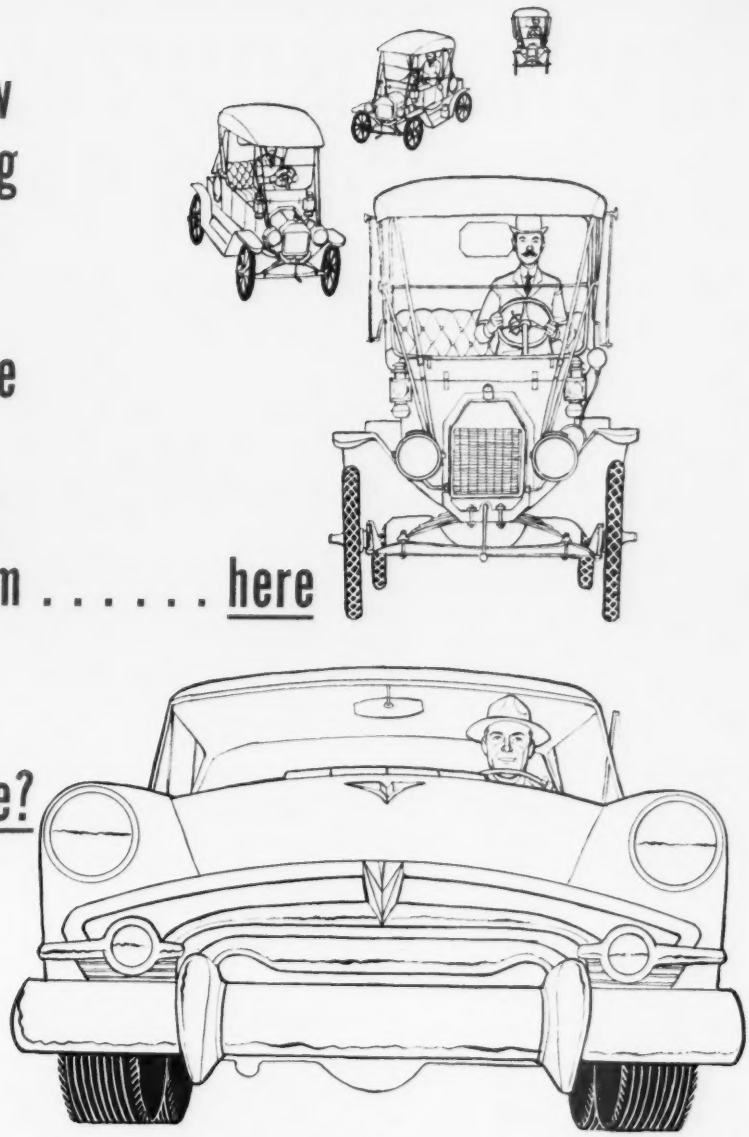
FOR COMPLETE INFORMATION about G-E Limitamp Control, contact your nearest G-E Apparatus Sales Office, or write to Section 781-7 for Bulletin GEA-5409 today. General Electric Company, Schenectady 5, N. Y.

MAINTENANCE IS EASY . . . Fuses swing forward on hinges for the disconnect position and fuses can be quickly lifted out.

You can put your confidence in—

GENERAL ELECTRIC

how long did it take to get from ..... here to here?



Answer: 40 years

The average life expectancy of an automobile tire has increased more than 10 times in the past 40 years. In 1909-10, the mileage obtained from tires was about 3,000 miles, contrasted with life today of 30,000 miles and more. Figures now reaching 35,000 are not uncommon, and may even range as high as 50,000 miles, depending on the driver and the condition of the car.

Many Monsanto products have contributed to the progress of the rubber industry.

Two important products, RZ-50 and RZ-50-B, ultra accelerators, have gained wide usage. Both materials give good cures, even at room temperatures. RZ-50-B is an emulsifiable form for use with latex. RZ-50, which contains the same active ingredient, is used in cements or dry rubber compounds cured at low temperatures. For information, or a copy of catalog on rubber chemicals, write MONSANTO CHEMICAL COMPANY, Rubber Chemical Sales, 920 Brown Street, Akron 11, Ohio.

THE HISTORY OF THE RUBBER INDUSTRY—Number 6

MONSANTO CHEMICALS FOR THE RUBBER INDUSTRY

ANTIOXIDANTS
Flectol* H
Santoflex* B
Santoflex BX
Santoflex 35
Santoflex AW
Santowhite* Crystals
Santowhite MK
Santowhite L

ALDEHYDE AMINE ACCELERATORS
A-32
A-100

MERCAPTO ACCELERATORS
Santocure*
El-Sixty*
Mertax (Purified Thiotax)
Thiotax (2-Mercapto benzothiazole)
Thiofide* (2,2' dithio-bis benzothiazole)

GUANIDINE ACCELERATORS
Diphenylguanidine (D.P.G.)
Guantal*

ULTRA ACCELERATORS FOR LATEX, ETC.
R-2 Crystals
RZ-50
RZ-50-B
Pip-Pip
Thiurad* (Tetramethyl-thiuram disulfide)
Ethyl Thiurad (Tetraethyl-thiuram disulfide)
Mono Thiurad (Tetramethyl-thiuram monosulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

SPECIAL MATERIALS
Thiocarbanilide ("A-1")
Santovar*-A
Santovar-O
Sulfasan R
Insoluble Sulfur "60"

COLORS

REODORANTS

**Reg. U. S. Pat. Off.*

MONSANTO
CHEMICALS – PLASTICS

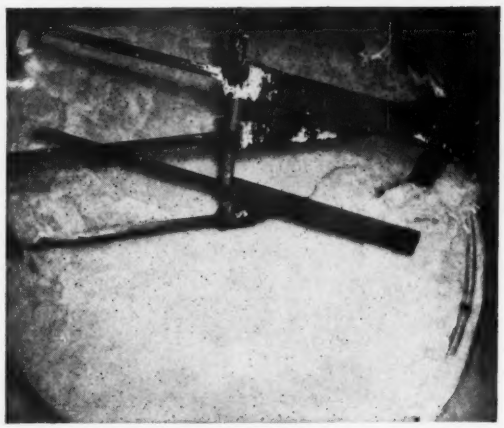
SERVING INDUSTRY...WHICH SERVES MANKIND

EMULSIFIERS AND INITIATORS SPECIALLY DESIGNED FOR GR-S

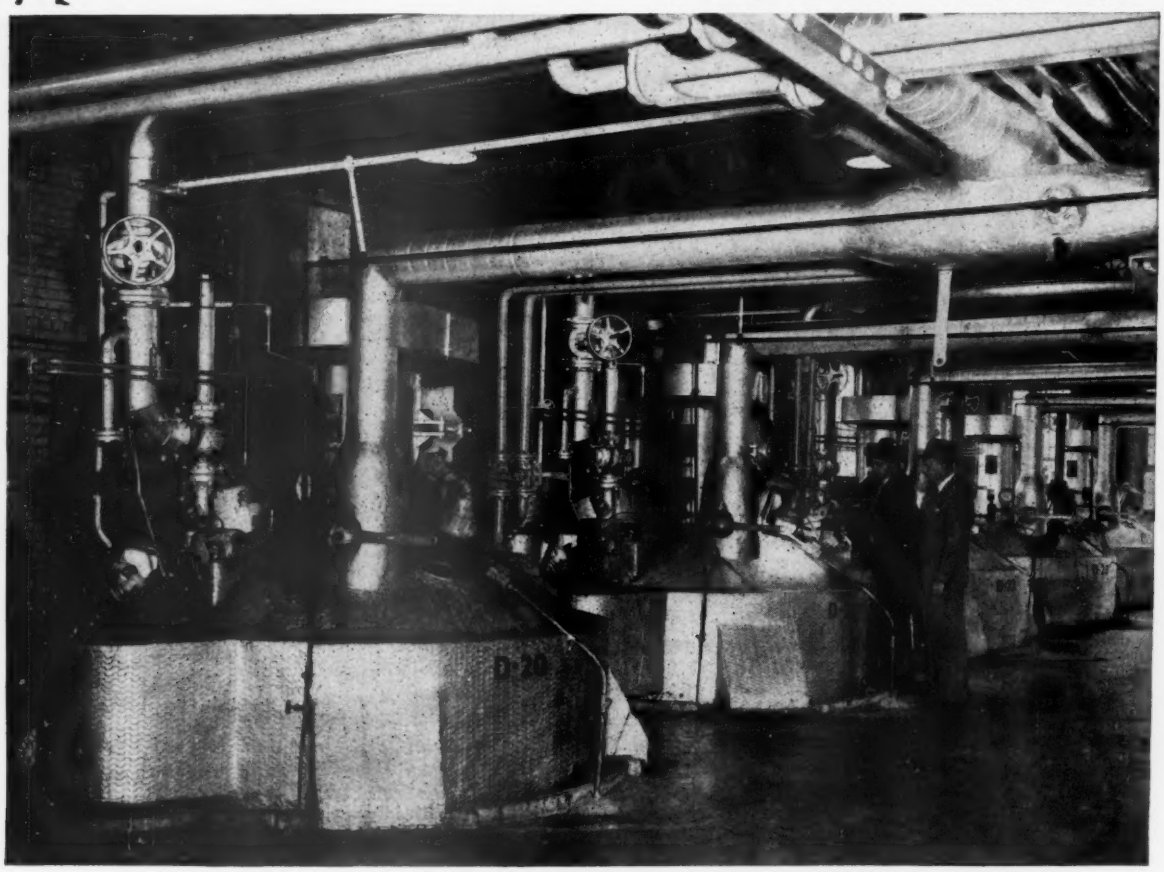
Hercules pioneered in the development of emulsifiers and initiators which were essential to the perfection of various grades of GR-S, particularly cold rubber. Today, these rosin derivatives are widely recognized by the synthetic rubber industry for their contributions to accelerated production cycles and superior product performance.

Hercules emulsifiers include Dresinate® 214 and 731—which offer optimum tensile strengths, elongation, and tear resistance in GR-S formulations. There are three Hercules hydroperoxides —Cumene (CHP), Para-Menthane (PMHP) and Diisopropylbenzene (DIBHP)—all noted for their stability and high polymerization action, especially at low temperatures.

HERCULES POWDER COMPANY
INCORPORATED
918 Market Street, Wilmington 99, Delaware



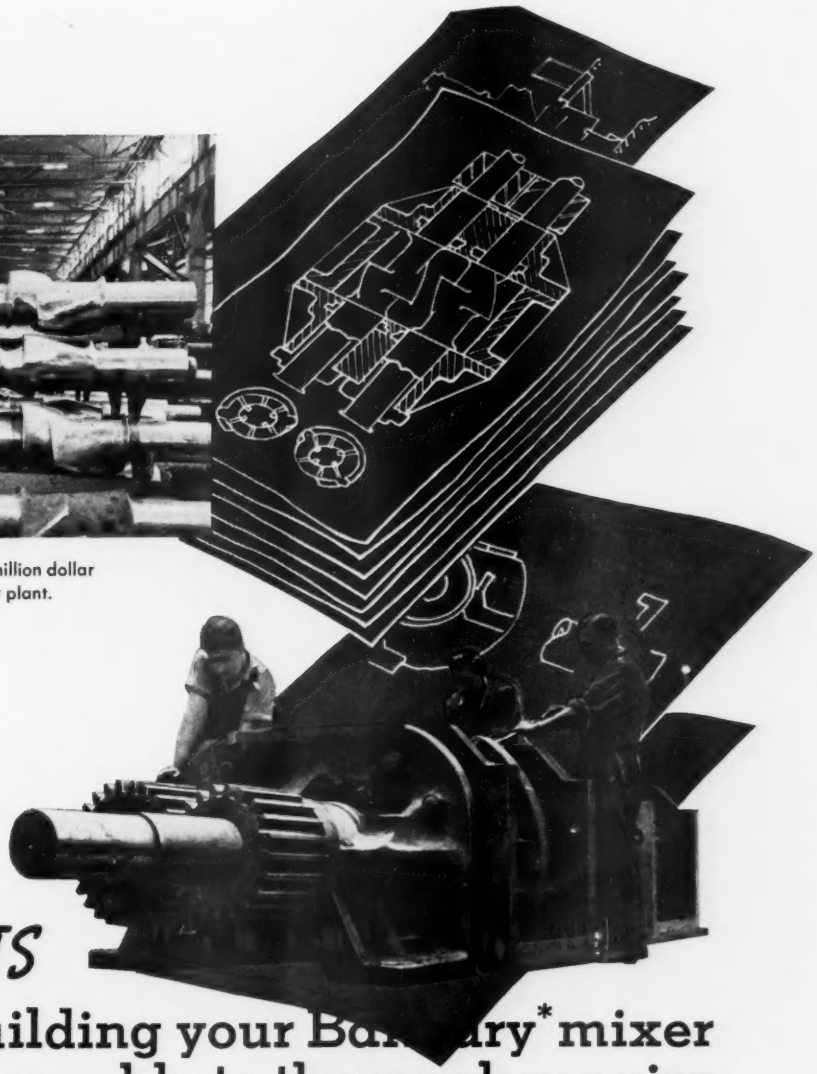
One step in the production of Dresinate—a digester at the Hercules plant in Hattiesburg, Mississippi. Here, as throughout all processing operations, quality control assures a uniformly high-quality product.



Section of a GR-S plant operated by B. F. Goodrich Chemical Company in Port Neches, Texas, where Hercules emulsifiers and initiators are used in the polymerization process.

IR53-2

Part of Farrel-Birmingham's million dollar stock at the company's Derby plant.



THE BLUEPRINTS

used in building your Banbury* mixer are indispensable to thorough repairs

Farrel-Birmingham is the only company having complete blueprints giving required engineering information about all of the 775 parts which comprise a Banbury mixer. It is from these blueprints that your Banbury was originally made, and it is these same blueprints which figure so vitally in the thorough rebuilding of your machine.

For example, when a part—such as a rotor, a door top, or the inside of the chamber body—is worn, these blueprints show us just how much rebuilding is required to return the part to its original dimensions. There is no guessing.

37 years as the sole manufacturer of the Banbury has given Farrel-Birmingham the unequalled experience, facilities, and *know-how* to return a worn Banbury to its original work capacity. Furthermore, modern features of design and improved material, which provide higher operating efficiency and greater wearing qualities, can now be incorporated into a rebuilt machine.

You can be assured of quick service on your Banbury repairs because we carry by far the largest existing stock of standard parts and complete new bodies.

FARREL-BIRMINGHAM COMPANY, INC.

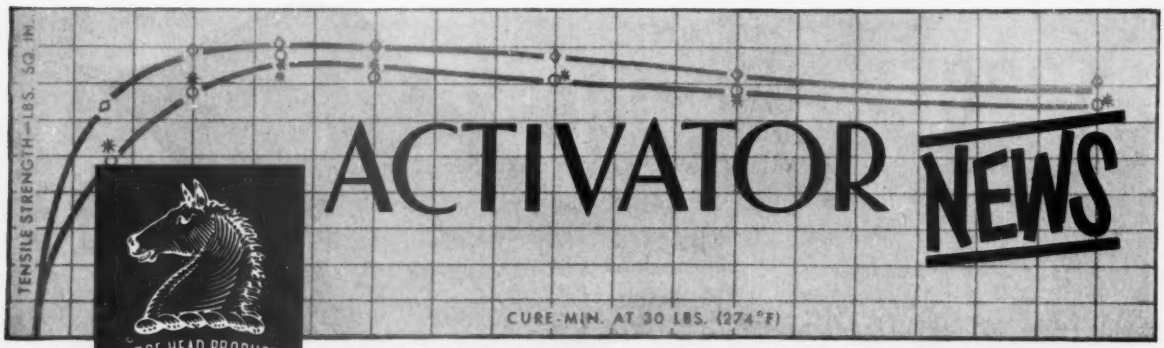
ANSONIA, CONN., (Telephone Ansonia 4-3331)

AKRON, OHIO, 2710 First National Tower (Tel. Jefferson 3149)
CHICAGO, ILLINOIS, 120 So. LaSalle St. (Tel. Andover 3-6434)
LOS ANGELES, CALIF., 2032 Santa Fe Ave. (Tel. Lafayette 3017)
HOUSTON, TEXAS, 860A M & M Building (Tel. Preston 4472)

*Trade-mark

Farrel-Birmingham®

FB-877



A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

UNIQUE COATING
on ZINC OXIDE outwits humidity

Customers tell us that, even in high humidity, switching to PROTOX*-166 ZINC OXIDE provides uniformly fast mixing and excellent dispersion.

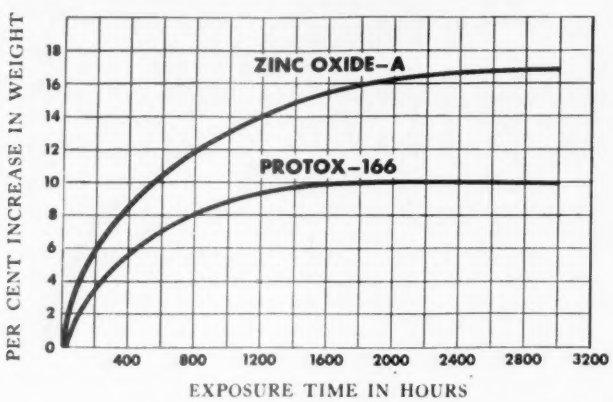
The outstanding humidity resistance of PROTOX-166 stems from the patented coating of zinc propionate that seals the individual particles. Here is how it works:

1. It reduces moisture pickup (see chart).
2. It prevents aggregation that leads to poor dispersion.
3. It is readily wetted by rubber.

*U. S. Patents 2,303,329 and 2,303,330

MOISTURE ABSORPTION OF ZINC OXIDES

under saturated conditions at 77° F.



Protox-166, surface-coated with zinc propionate, picks up less moisture in storage than do untreated types, such as Zinc Oxide-A, and thus processes more uniformly and faster.

TEST PROCEDURE

Three grams of pigment were weighed into wide-mouth (2" dia.) weighing bottles and conditioned for 24 hours over calcium chloride at room temperature. After determining the net weights of the samples, the bottles were stored, unstoppered, over water in a large container held in a constant temperature (77°F.) room. The thin layer of each sample was stirred once daily to assure a uniform condition throughout the oxide, and was weighed periodically to determine the per cent increase in weight.

NOTE: The per cent moisture pickup for zinc oxides in this test is, of course, far more than would occur under industrial storage conditions in multi-walled bags.

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

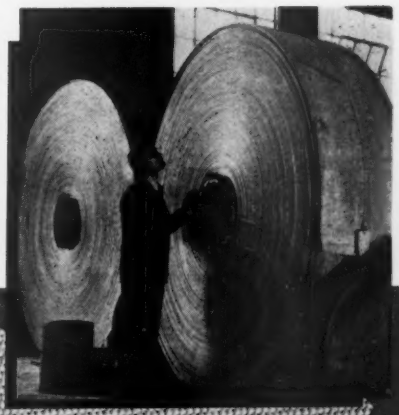
... most used by rubber manufacturers since 1852

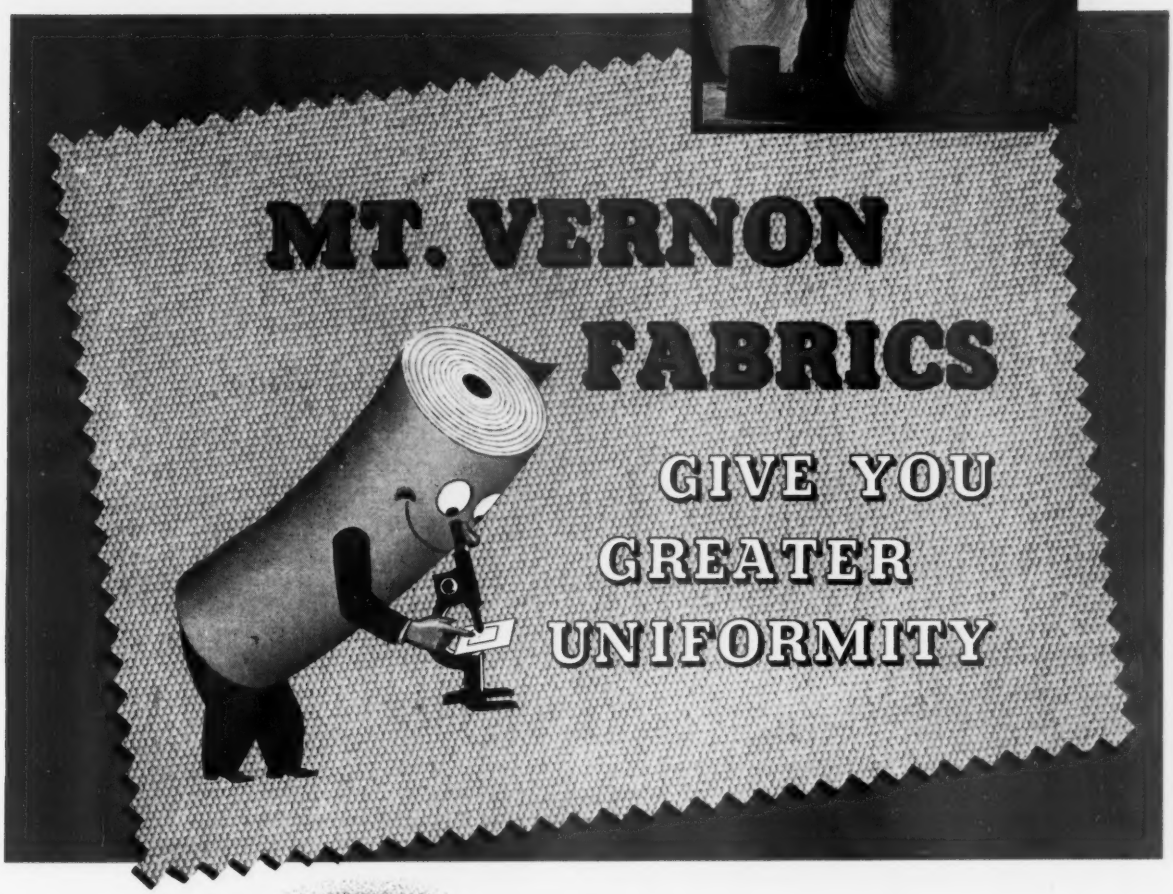
160 Front Street, New York 38, N. Y.

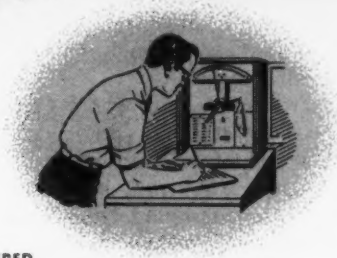
HORSE HEAD PRODUCTS

UNIFORMITY

Makes The Big Difference In INDUSTRIAL FABRICS







One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here yarn number is being determined with Suter Scales.

FABRICS ENGINEERED TO FIT YOUR NEEDS

Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric —cotton, synthetic or blend — to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

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IRON and ALLOY IRON ROLLS

for Processing Rubber and Plastics

National Rolls

A SIZE AND TYPE FOR EVERY PURPOSE

In addition to producing rolls to meet your requirements for processing rubber or plastics, National performs many other functions which may be of service to you.

For instance, you may be getting average service from your chilled iron rolls; but our metallurgists who are frequently consulted on tough roll problems, may be able to recommend an alloy iron roll that will stand up much longer under the higher pressures, greater speeds and abrasions to which rolls are now subjected in processing rubber and plastics. This may result in considerable savings through reduced down time and longer intervals between roll grinds.

Then, too, our product development staff is constantly working on design improvement and better metallurgical composition, through experiments with various alloys, to give you even better performing rolls.

We'd like to tell you more about our extensive roll producing facilities and about our 45 years experience making rolls for the steel producing and allied industries. We have a booklet, "This is National" which describes them fully. Please write for your copy today.

THE NATIONAL ROLL & FOUNDRY CO.

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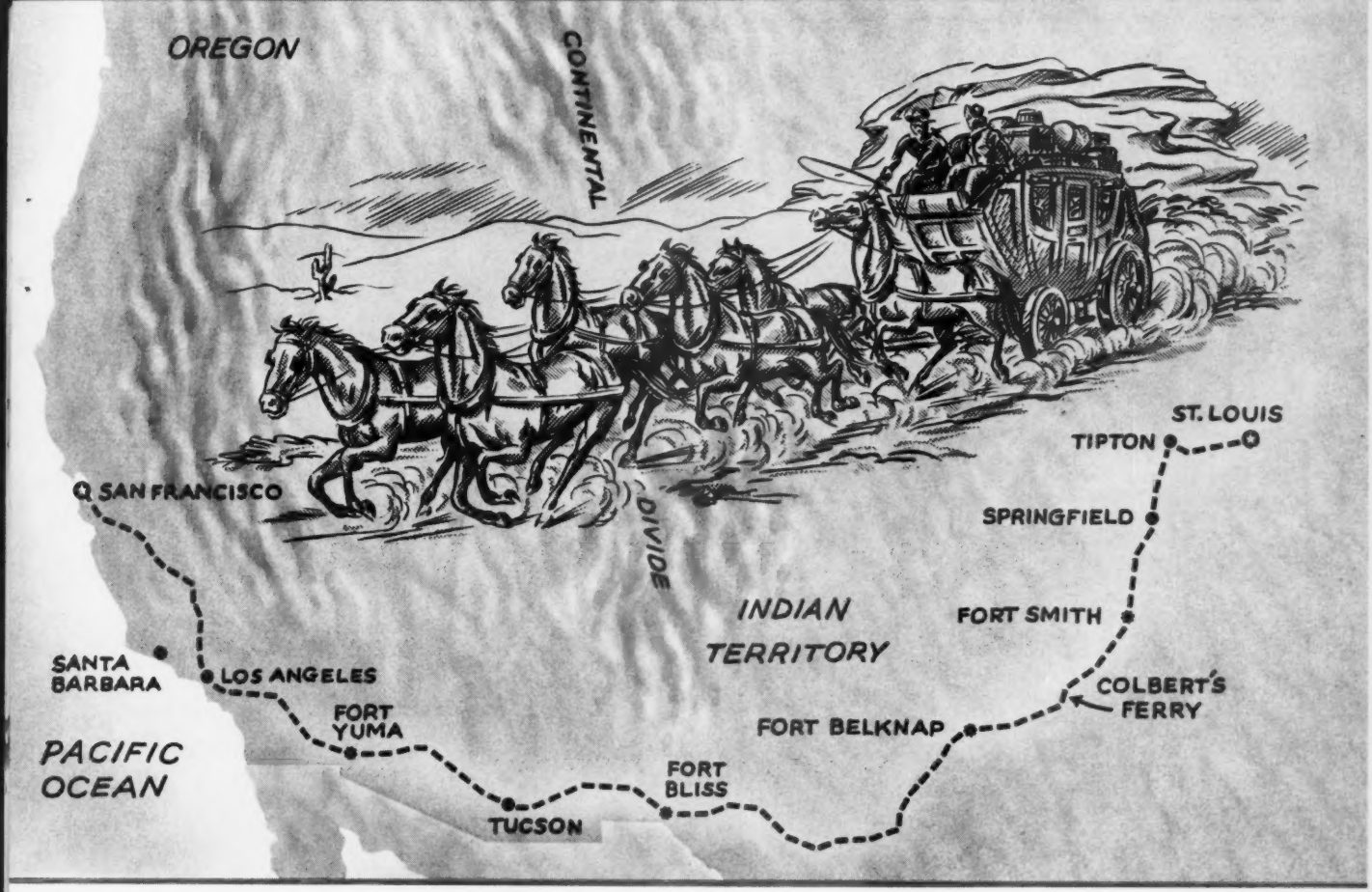
SPECIALISTS IN IRON, ALLOY IRON AND STEEL ROLLS AND CASTINGS

NI-HARD • NI-RESIST • DUCTILE CAST IRON



The Butterfield Trail

Among the most famous and longest of the freight and trade trails of the early west was the Butterfield Trail, which began operations in 1858 and gave way to the railroad in 1881. The route started from Tipton, Missouri, angled south through Arkansas, across Texas, New Mexico, across Arizona, into California, terminating at San Francisco, a distance of 2800 miles.

The entire trip was scheduled for 25 days, but was later reduced to 23. (The record run was 21 days.) The Butterfield coaches started on a semi-weekly basis, but so great was the traffic that the schedule was shortly changed to six times per week. Passengers paid $150 in gold to travel from San Francisco east, and $200 for the western run. Letters went for 10 cents a half ounce.

Butterfield's Overland Mail, as it was called, furnished the first dependable, well-organized service to the Pacific. There were 160 stations and corrals along the way, wells had to be dug, bridges built, repair shops set up. A personnel of 750 experienced men was needed to serve as agents, drivers, stationkeepers, hostlers and mechanics. The first trip was hailed as another triumph of American enterprise.

Think of riding more than 20 days in a Concord stage coach, over plains, desert and mountains. (Most passengers broke up the trips with stop-overs.) Today, in a fraction of time, the rubber tire transports people and products on a cushion of air with speed and convenience. Vast areas have been opened up, communication speeded, and a nation exchanges the products of its soil and skill within hours, at the most a few days.

Today's rubber tire is another example of American ingenuity and enterprise. Constantly improved, it has brought about increasingly faster communication. Among the important contributors to this ingenuity and enterprise are the makers of United Blacks, whose dependable products help put strength, durability and long-life into the modern passenger and truck tire.

UNITED CARBON COMPANY, INC.

Kosmos 35 is a new United black from oil-enriched gas in the class of General Purpose Furnace (GPF). Kosmos 35 is an easy processing, quick-curing furnace black with adequate reinforcement, high resiliency and low heat build-up — the proper black for tire body stocks; likewise recommended for Butyl tubes and industrial rubber goods where desirable extrusion features, smooth appearance, dimensional stability and sufficient reinforcement will enhance their quality.

Kosmos 35 — Use it straight or blended with other United blacks. Forge ahead with United blacks.

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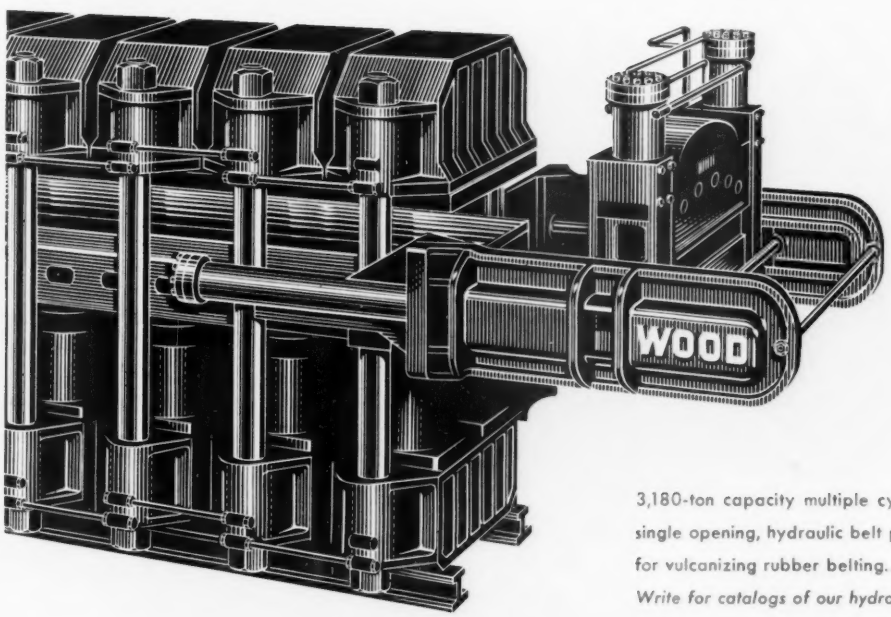
R.D. Wood Hydraulic Presses

". . . that industrial equipment which has maintained high excellence in manufacture will continue to be sold, and will contribute its worth to uplifting the general quality of everything produced in industrial America . . ."



3,180-ton capacity multiple cylinder, single opening, hydraulic belt press for vulcanizing rubber belting.
Write for catalogs of our hydraulic presses.

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PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

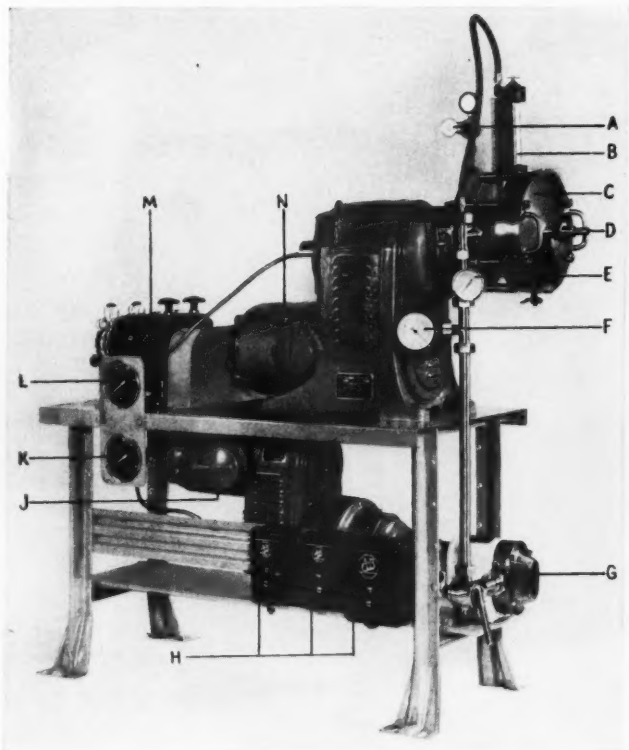
HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

FOAM RUBBER MIXING BY PUSH-BUTTON METHOD!

Continuous — Automatic!

We know this may sound a bit bombastic because foaming latex by oldtime conventional batch methods is a sticky business that takes a lot of back and brawn, and leaves plenty of room for error. But continuous, automatic, push-button mixing under fingertip control is now being provided by Oakes Continuous Automatic Mixers in large and small plants everywhere. The superiority of product is such, and the savings so substantial in so many directions, that plants wishing to maintain their competitive position in today's swiftly expanding market are finding Oakes Mixers an absolute essential.

The Oakes Continuous Automatic Mixer is capable of foaming latex to a blow-up of as much as 16 to 1, with a throughput capacity of 50 to 1800 pounds of wet latex per hour—predetermined density can be obtained at will and held uniformly. The resultant product is of exceptional quality—uniformly fine-celled and velvet-smooth, with maximum strength. Production is up to 900 pounds per hour with the smaller model, and up to 1800 pounds per hour with the larger. Savings in latex and all other formula materials, of as much as 15% have been realized; "rejects" have been reduced as much as 75%. In plants producing upwards of 1,000 pounds per hour savings in labor have been as much as six people. Foam is more stable. Injection molding is made possible. Less floor space is required; refrigerated, air conditioned rooms are unnecessary. These are but a few of the features that have made the Oakes preferred equipment.



A. Air Pressure Regulating Valve
B. Air Flowmeter
C. Mixing Head
D. Discharge Hose Connection
E. Product Thermometer
F. Pressure Gauge
G. Latex Pump
H. Starting Boxes
J. Pump Speed Regulator
K. Pump Tachometer
L. Mixer Speed Tachometer
M. Chemical Proportioning Pumps
N. Mixer Speed Regulator

Oakes Continuous Automatic Mixer

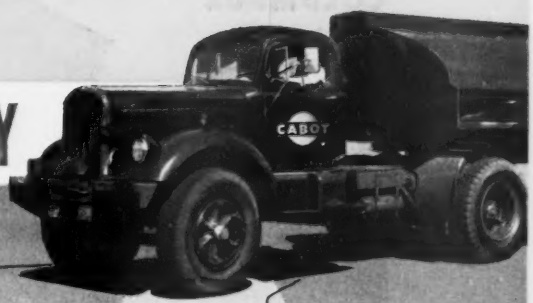
Available only through

THE E. T. OAKES CORPORATION

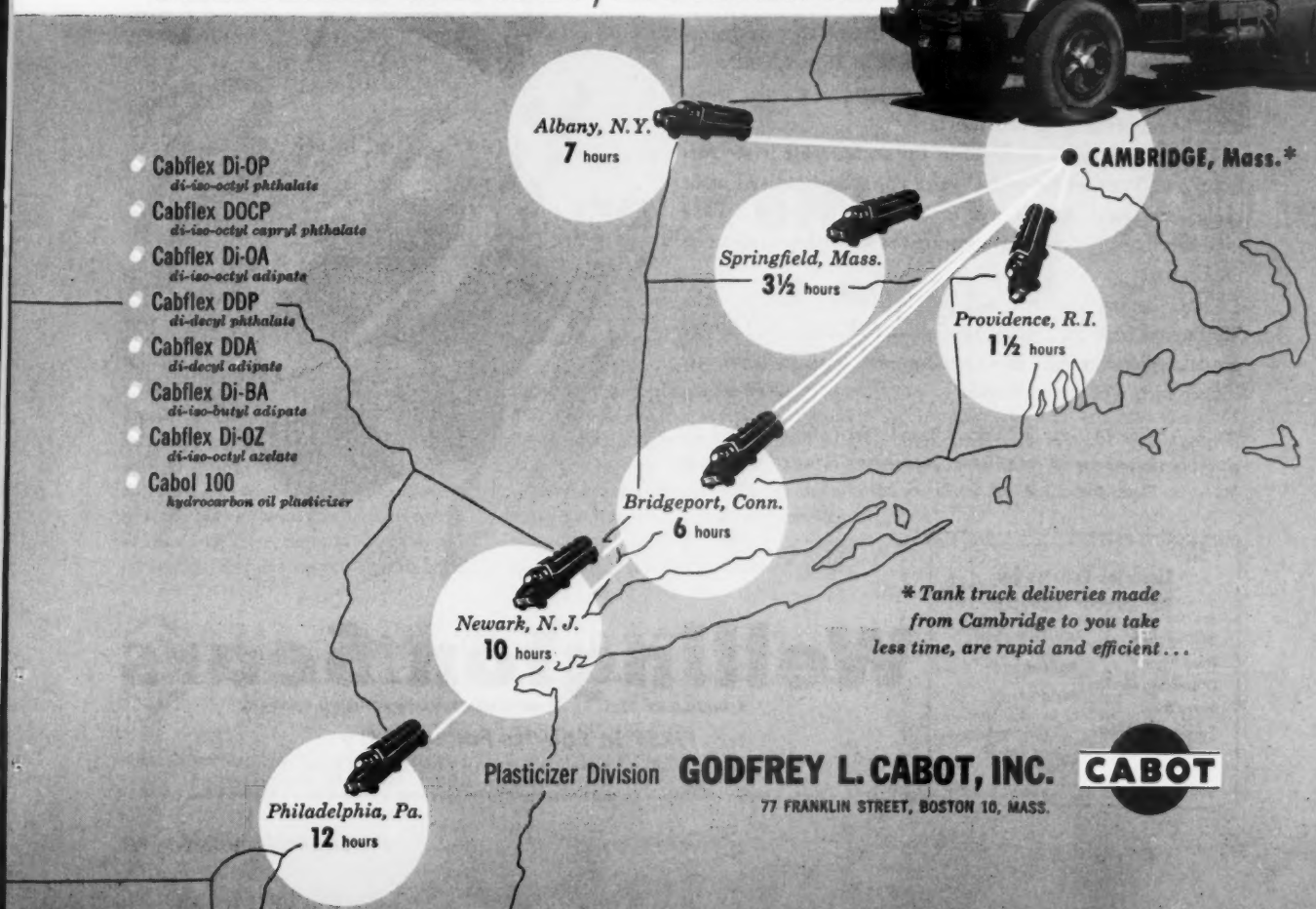
ISLIP, LONG ISLAND, NEW YORK

Cabot "Cabflex" Plasticizers

DELIVERED RAPIDLY, EFFICIENTLY



- **Cabflex Di-OP** *di-iso-octyl phthalate*
- **Cabflex DOCP** *di-iso-octyl capryl phthalate*
- **Cabflex Di-OA** *di-iso-octyl adipate*
- **Cabflex DDP** *di-decyl phthalate*
- **Cabflex DDA** *di-decyl adipate*
- **Cabflex Di-BA** *di-iso-butyl adipate*
- **Cabflex Di-OZ** *di-iso-octyl azelate*
- **Cabol 100** *hydrocarbon oil plasticizer*



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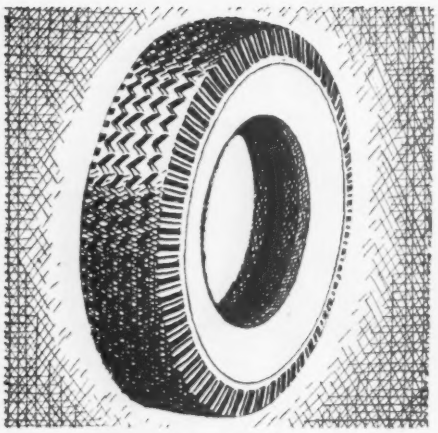
Plasticizer Division **GODFREY L. CABOT, INC.**
77 FRANKLIN STREET, BOSTON 10, MASS.

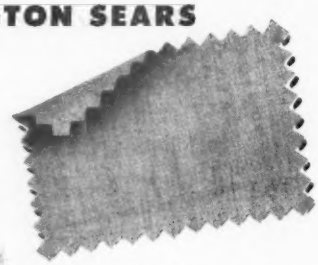
CABOT

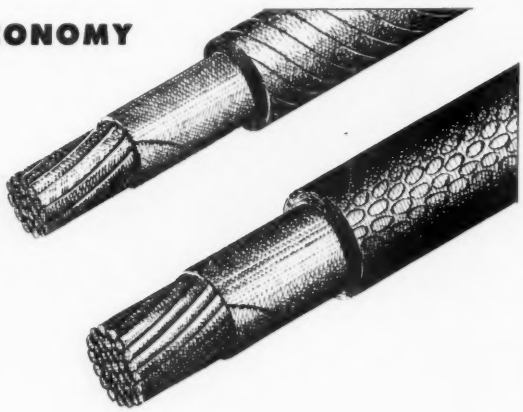


Woven for strength and abrasion resistance, chafer duck is typical of Wellington Sears reinforcing fabrics.

Wellington Sears rubber footwear fabrics include sturdy, economical and easily adhesive enameling duck for tennis and gym shoes and other rubber footwear.

YOU GET UNIFORM QUALITY AND ECONOMY WITH WELLINGTON SEARS COLUMBUS SHEETING



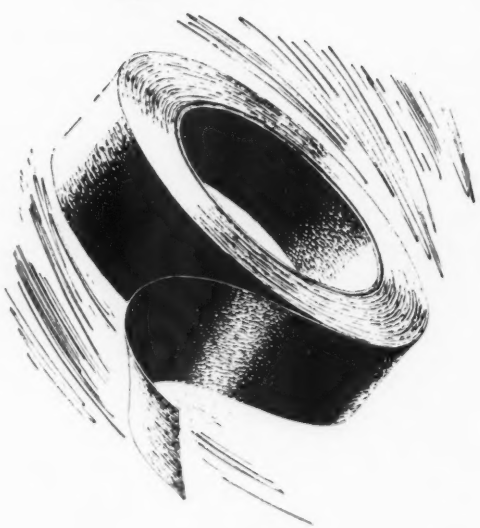


Matching quality, yard after yard, is the basis for Columbus sheeting's long-standing reputation in rubber fabrication. Lightweight and economical, it is carefully woven to yield an absolute minimum of rubberizing process rejects.

These sheetings are made 40 to 120 inches wide in weights from 2 to 5 ounces per square yard. For submarine and other cable wrapping . . . friction tape . . . heavy duty raincoats . . . hospital sheeting . . . Columbus sheeting has versatility to equal its uniformity.

Other cotton, synthetic, and blended fabrics available from Wellington Sears for coating, specialties, and mechanical rubber goods are listed at right. If it's a rubber-and-fabric problem, talk it over with Wellington Sears.

Write for your free copy of "Modern Textiles for Industry" which includes pertinent information on rubber applications. Address: Wellington Sears Co., Dept. L-4 65 Worth St., N. Y. 13.



Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
- Single and plied-yarn chafers
- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high tenacity rayon, other synthetics and combinations.

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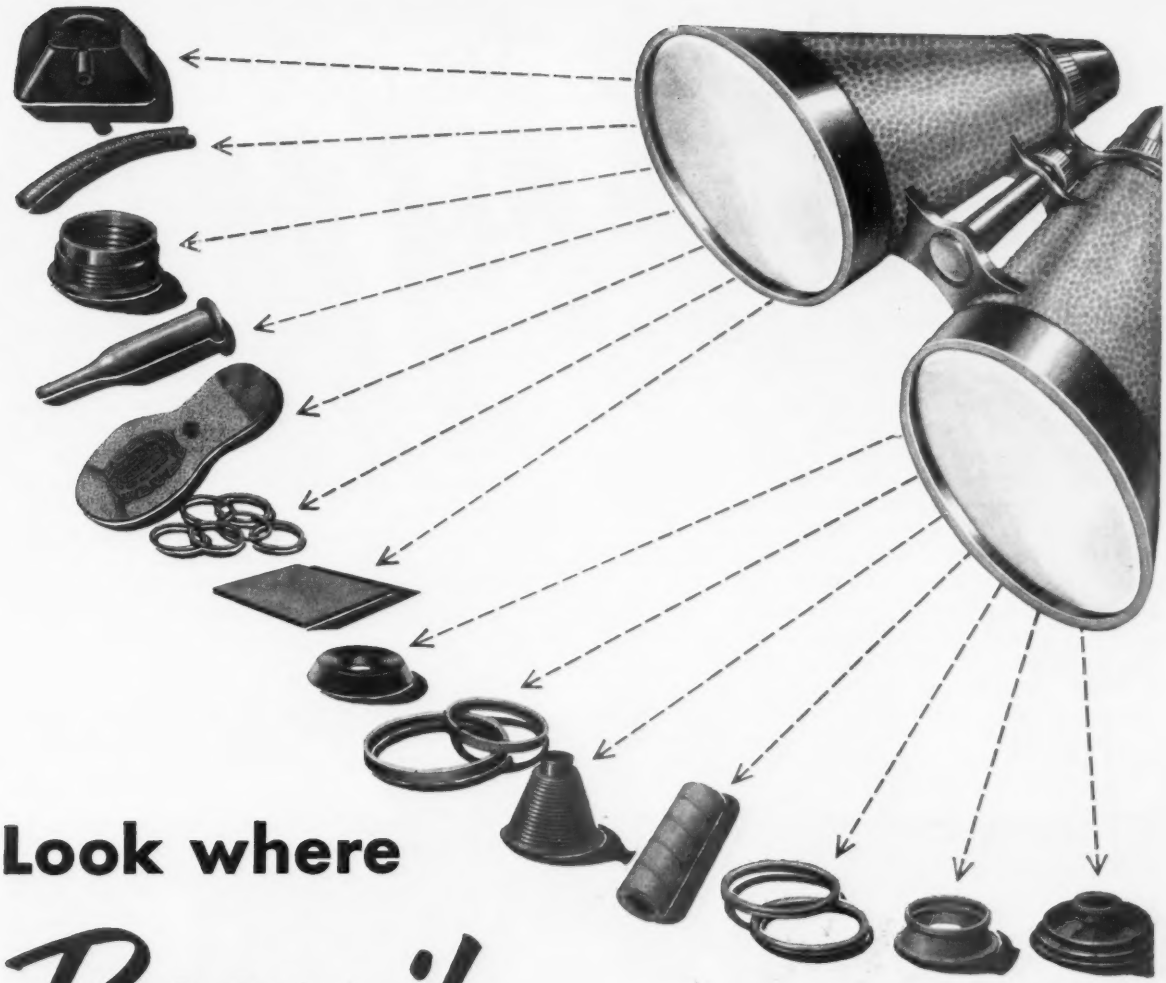
FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

Offices In: Atlanta • Boston • Chicago • Detroit • Los Angeles • New Orleans • Philadelphia • San Francisco • St. Louis



Look where

Paracril pays off!

And chances are you'll see how this unusual nitrile type rubber can pay off for **you** — in product performance and durability.

Paracril® has demonstrated its advantages in a wide variety of rubber products, including high-pressure grease hose — fuel and oil conducting hose — printing rolls and blankets—cements—Signal Corps field carrier cable—pressure flex hose for service at minus 65° F.—coffee maker seal rings—oil field pump valve inserts—aircraft boots and seals—"O" rings—cord shoe soles—and in hundreds of similar applications.

Wherever you need outstanding oil, fuel, and chemical resistance, low-temperature flexibility, toughness and abrasion resistance, resilience, heat resistance, or any combination of these properties, you'll find Paracril just what your product ordered.

Available in three general grades of oil resistance—moderate, good, and excellent—easy-processing Paracril can be extruded, calendered, or molded by standard rubber techniques. It may be blended with other rubbers or with plastic resins to impart special properties — can be used to advantage **wherever** a rubber-like material is needed.

If you're not fully aware of the many advantages Paracril offers **you**, you'll want to obtain samples for evaluation immediately. Send the coupon below.

Naugatuck Chemical, 1012 Elm Street, Naugatuck, Conn.
Please send ☐ samples, ☐ free booklet, *Paracril Characteristics and Compounding*, to:

Name _____
Title _____
Company _____
Address _____
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Naugatuck Chemical

Division of United States Rubber Company
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Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals
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We like to get complaints like this !!

Recently our salesman visited the Hewitt Rubber Division of Hewitt-Robins Incorporated in Buffalo, N. Y., and asked how our new control system on one of their Banbury mixers was working out. "We have only one complaint", said the department supervisor: "when are you going to sell us the same hookup for the other Banbury?" Our man was glad to report that it had in fact already been ordered. This is particularly interesting because the "hookup" referred to is an ingenious system developed by Taylor to automatically *control* the temperature of the mix in a Banbury.

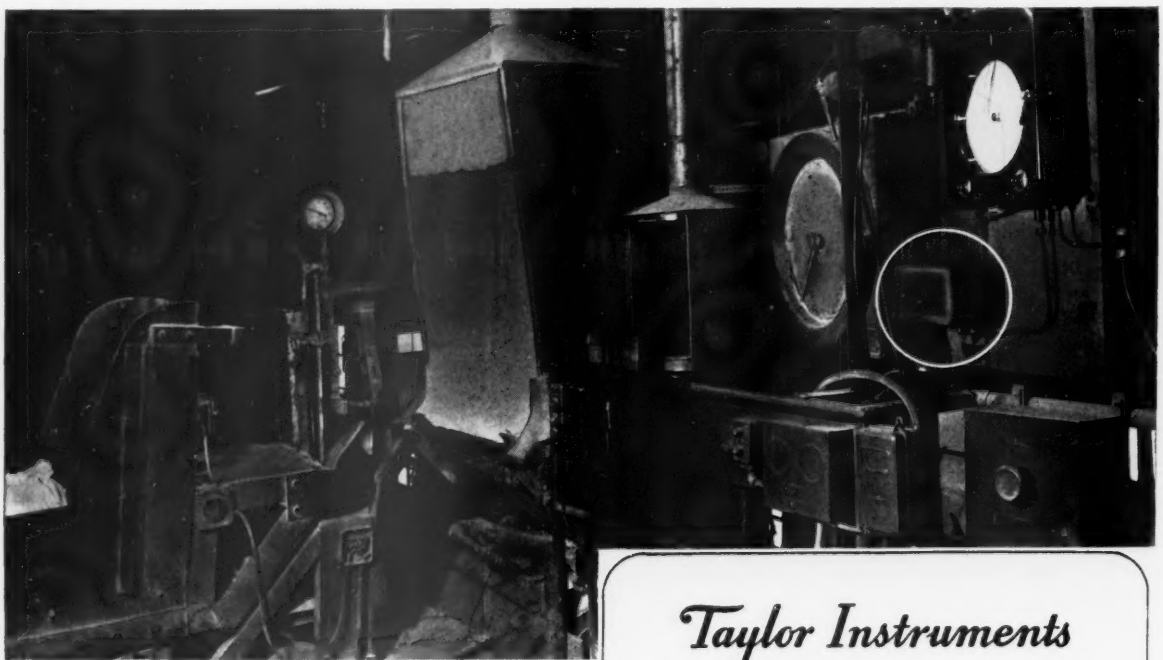
The heart of this system is the Taylor TRANSAIRE* Temperature Transmitter — a rugged, highly responsive temperature measuring system, economically applied to Banbury mixers. Its exceptionally fast response is due to the exclusive SPEED-ACT* derivative action, in the measuring circuit. This compensates for both the poor heat conductivity of the mix and the inherent thermal lag of the rugged separable well required. The output air pressure from the transmitter is connected to a Taylor FULSCOPE* Recording Controller, which regulates the admission of cold water as required to cool the mix, and gives them an accurate record of both the temperature and the time of every batch.

Hewitt-Robins' supervisor probably has plenty of other problems, but with Taylor in control he's sure of consistent mix temperatures in his Banbury, and he doesn't have to worry about heat deterioration—or the risk of fire. Call your Taylor Field Engineer on any instrumentation problem—or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

▼ ▼ ▼

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Trade-Mark



Here's how it works: cigarette size bulb of TRANSAIRE Transmitter is installed through wall of mixer about 1½" into mix just above rolls. Impulses are relayed to a Taylor FULSCOPE Recording Controller, operating a diaphragm valve in the chilled water line. This admits cold water as required to cool the mix to the desired temperature. Also provides record of true temperature and actual time of each batch.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

SHELL DUTREX®

AN ECONOMICAL GROUP
OF PLASTICIZERS AND EXTENDERS
FOR RUBBER AND PLASTICS

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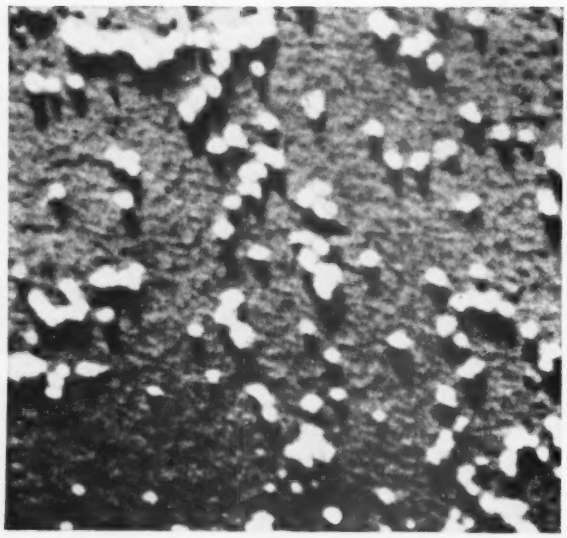
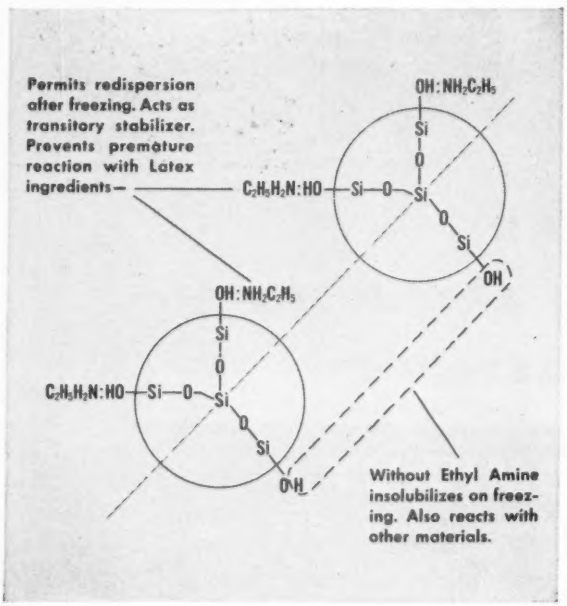
How Du Pont "LUDOX" can



What "LUDOX" is

"Ludox" is a 30% colloidal solution of almost pure amorphous silica particles (SiO_2) in the form of polymerized silicic acid. The electron photomicrograph—magnification 175,000 times—shows the fineness and uniformity of "Ludox" particles. The average particle's size of 17 millimicrons is below the range of the best carbon blacks.



Any of these valuable modifying effects can be produced by adding "LUDOX" to latex formulations

- Improved Adhesion
- Increased Stiffness
- Increased Water Resistance
- Increased Abrasion Resistance
- Decreased Dry Tack

How "LUDOX" works

The diagram at left shows surface hydroxyl groups on "Ludox" particles. These groups make the particles chemically reactive in contrast to commonly used dry fillers. This reactivity has led to many unusual properties and uses for "Ludox" in the latex field. The diagram also shows a typical "Ludox" reaction—with and without monoethylamine. The reaction with ethyl amine is useful in the stabilization of some latices containing "Ludox."

improve latex products

Your chemists can create new combinations of properties in latex-dipped goods, coatings, adhesives . . . whatever products you make—using Du Pont "Ludox"* colloidal silica. And new properties can mean new sales advantages –new markets for your products.

Here are some examples of how "Ludox" has improved latex products:

Neoprene thread was produced with a nearly doubled modulus over the entire range of elongation. Seven parts of "Ludox" were added per 100 parts neoprene latex. Modulus can be increased, too, in natural rubber films.

In neoprene-coated belting, adhesion was improved and flaking stopped by adding "Ludox." In a paper saturant, abrasion resistance was increased 20 to 40%!

A natural-rubber adhesive was doubled in strength of leather-to-leather adhesion when 20 parts of "Ludox" solids were added per 100 parts natural rubber latex solids. Such outstanding improvements have also led to the use of "Ludox" in GRS and neoprene latex adhesives and coatings.

An uncured Buna N solvent coating on cloth had no surface tack whatsoever when treated with "Ludox." In decreasing or eliminating tackiness, "Ludox" can be applied as an aftercoat or, in the case of latex, incorporated in the compound.

Neoprene films have shown exceptional increases in water resistance and decreases in water swelling upon addition of 20 parts "Ludox" solids per 100 parts neoprene latex solids.

Neoprene foam required about 20% less solids to attain a given modulus when 5 parts of "Ludox" solids were added per 100 parts dry neoprene. This saving of raw material was obtained without affecting flex life, bend flex, or compression set.

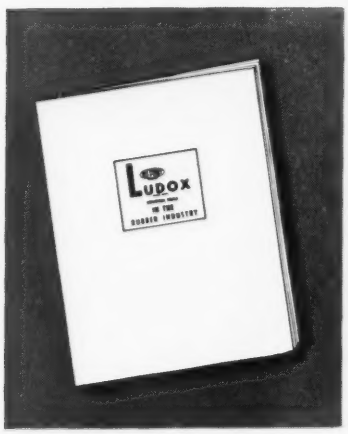
In these and other cases "Ludox" has provided combinations of properties difficult to achieve by any other means.

What's more, a little "Ludox" goes a long way.

To learn more about how silica chemistry with Du Pont "Ludox" can help improve your products, mail the coupon below, or write on your letterhead today.

*REG U.S. PAT OFF.

Send for this informative booklet: "'LUDOX' in the Rubber Industry"



E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Department, Wilmington 98, Delaware

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DU PONT "LUDOX" COLLOIDAL SILICA

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BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

Titanox-for GOOD LOOKS in WHITE WALLS

White sidewalls pigmented with Titanox titanium dioxide pigments are the cleanest, brightest white you've ever seen and they stay that way. Titanox pigments can contribute more to white sidewalls than just good looks. Indications are that Titanox "non-chalking" rutile pigments—especially TITANOX-RA-NC—fortify white walls against crazing, chalking and checking... help maintain the even, brilliant original white of new tires.

Physically and chemically stable, Titanox titanium dioxide pigments are compatible with natural and synthetic rubbers, as well as compounding ingredients. Our Technical Service Department is ready at any time to help you choose the best Titanox pigments for your rubber formulations. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

1158

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

KNIT your profits

—at high speeds . . .

. . . with Fidelity's method of HOSE reinforcement

You can knit natural and synthetic yarns at speeds up to 1,000 feet per hour on rubber and plastic extrusions in continuous lengths. Hose is strong and *flexible*, adhesion is better, diameters are uniform.

By eliminating costly rewinding, treating and drying operations, electrically controlled Fidelity Hose Reinforcement Machines are setting new economy records in plants where they replace conventional braiders. These machines have been time tested by the world's leading Rubber Hose Manufacturers for nearly 20 years.

Write today for Catalog HR describing advantages and technical details. When in the Philadelphia area, visit the new showroom at our plant and see the Fidelity Hose Reinforcement Machine in operation.

Designers and Builders of Intricate, Automatic Precision Machines

SINCE 1911

FIDELITY MACHINE COMPANY, INC.

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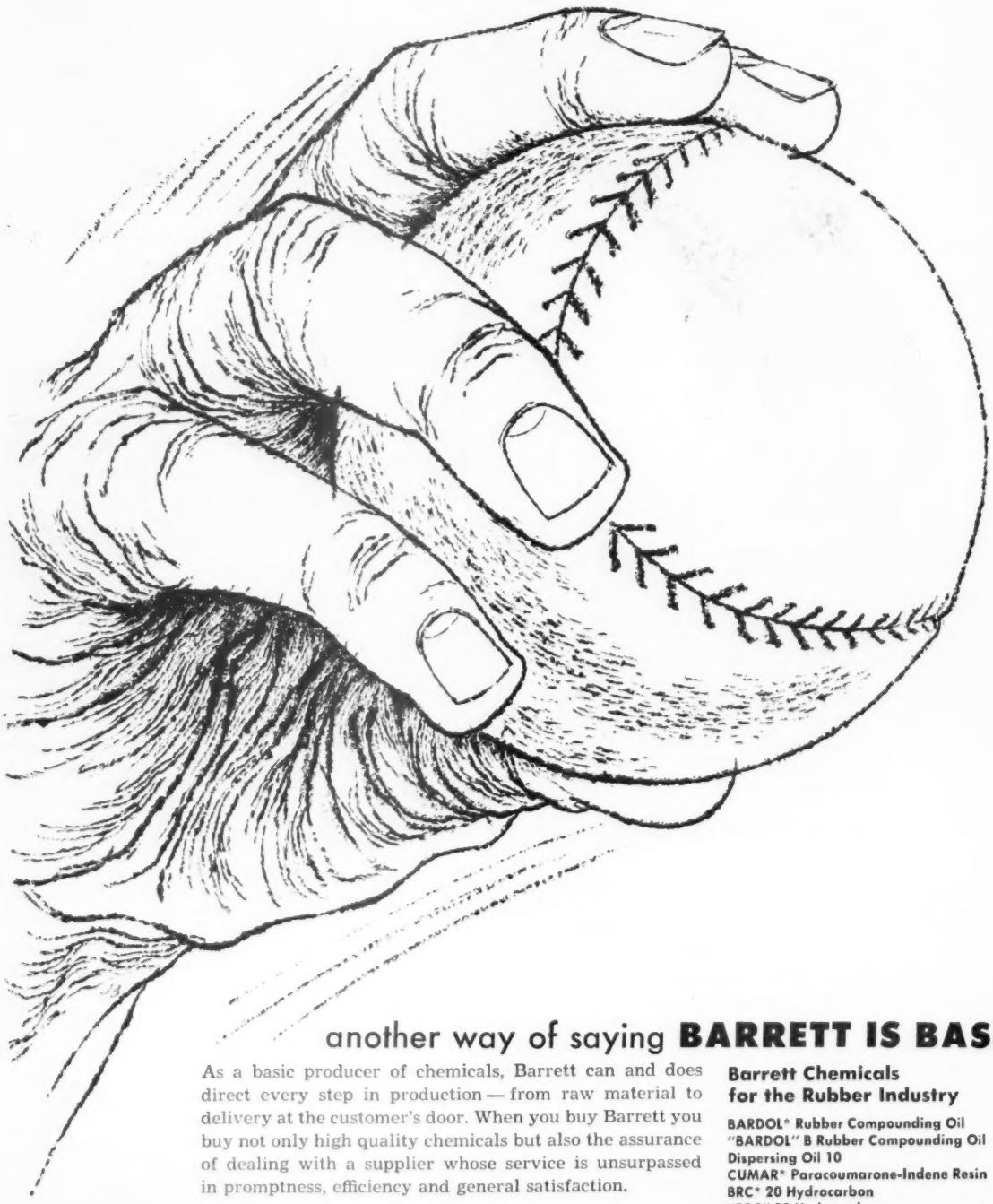
CONTROL of Quality, Uniformity, Supply



another way of saying **BARRETT IS BASIC**

As a basic producer of chemicals, Barrett can and does direct every step in production — from raw material to delivery at the customer's door. When you buy Barrett you buy not only high quality chemicals but also the assurance of dealing with a supplier whose service is unsurpassed in promptness, efficiency and general satisfaction.

Barrett Chemicals for the Rubber Industry

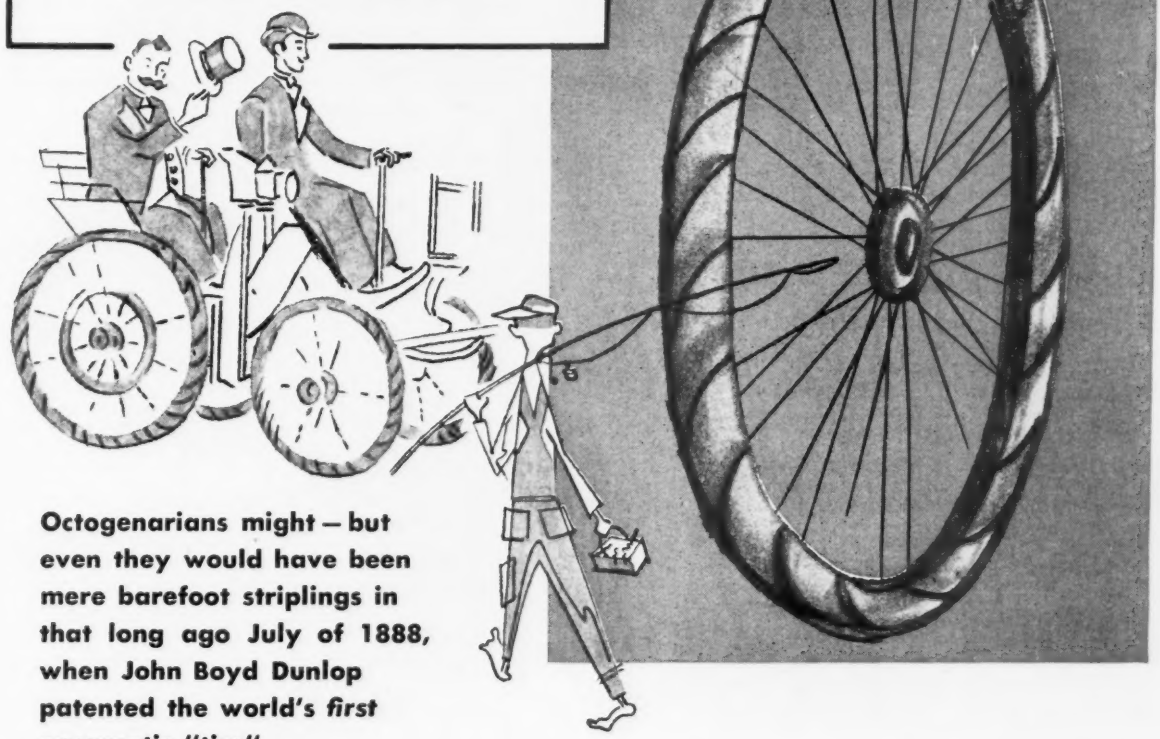
BARDOL* Rubber Compounding Oil
"BARDOL" B Rubber Compounding Oil
Dispersing Oil 10
CUMAR* Paracoumarone-Indene Resin
BRC* 20 Hydrocarbon
"BRC" 30 Hydrocarbon
BRV* Rubber Softener
BRT* 3 Rubber Reclaiming Tar
"BRT" 4 Rubber Reclaiming Tar
Resin "C" Resinous Compounding Material
Dibutyl Phthalate
ELASTEX* 28-P Plasticizer (DOP)
"ELASTEX" 10-P Plasticizer (DIOP)
"ELASTEX" DCHP Plasticizer
"ELASTEX" 50-B* Plasticizer
"ELASTEX" 80-P Plasticizer (Dicapryl Phthalate)

Barrett*

BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
Allied Chemical
40 RECTOR STREET, NEW YORK 6, N. Y.

In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.
*Reg. U. S. Pat. Off.

REMEMBER THIS TREAD?



Octogenarians might — but even they would have been mere barefoot striplings in that long ago July of 1888, when John Boyd Dunlop patented the world's *first* pneumatic "tire"

THERE really wasn't much tread to remember . . . just a few edges where the crude "wrappings" overlapped. But their dim imprint in the dusty roads of those bygone days, heralded the marvelous tires that make our motor vehicles "airborne" today. Indeed, our dramatic age of motor transport, and the great tire industry that makes it possible, *both* owe their very existence to the first Dunlop "Pneumatic Tire."

At Bridgwater, we're well acquainted with most of the history of pneumatic tire development. As manufacturers of automotive tire molds, we've worked closely with the industry for nearly half a century, *helping* it develop . . . helping it meet steadily growing demands for tires by furnishing molds and equipment of higher quality and greater *workability*. In fact, the splendid Dunlops of today —and most of the nation's other best-known tires— come from molds built by Bridgwater.

Today, in Athens, Ohio, Bridgwater's Athens Machine Division meets the mold requirements of the tire industry on a greater scale than ever . . . with a larger plant, and a larger complement of technicians and long-experienced metal-working craftsmen. These skilled artisans and their specialized machines—many of our own design—produce finer quality molds of every type or size, in engraved steel, cast iron or aluminum.

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Akron, Ohio

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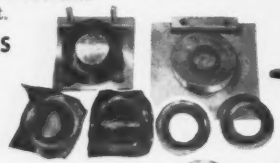

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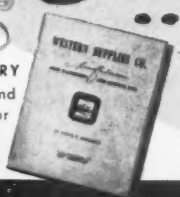

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SKELLYSOLVE C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve B. Closed cup flash point about 13°F.

SKELLYSOLVE D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds. Closed cup flash point about 3°F.

SKELLYSOLVE H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve D is desired. Closed cup flash point about —20°F.

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SKELLY

Skellysolve

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for a
Merry Christmas
and a prosperous
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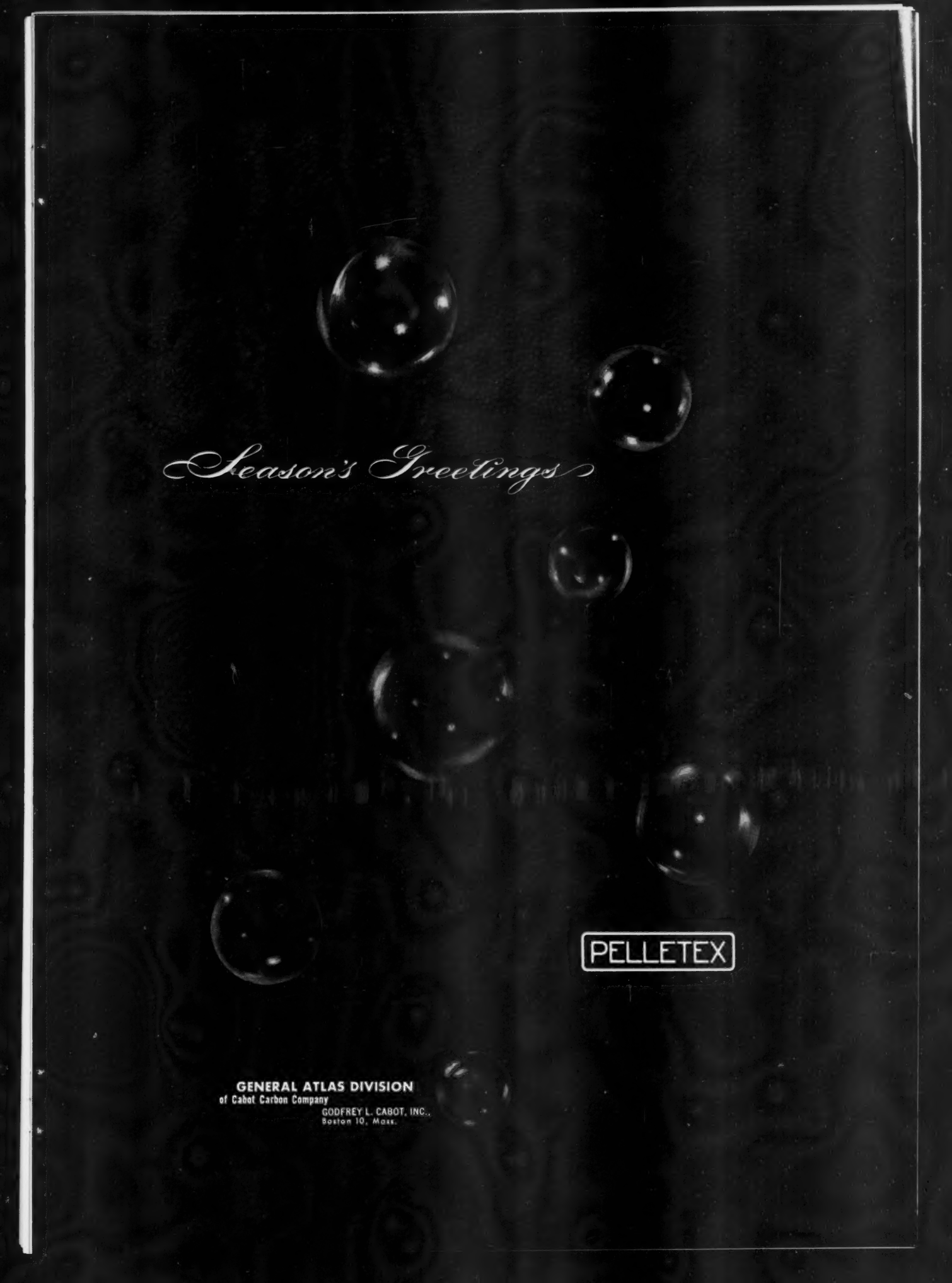

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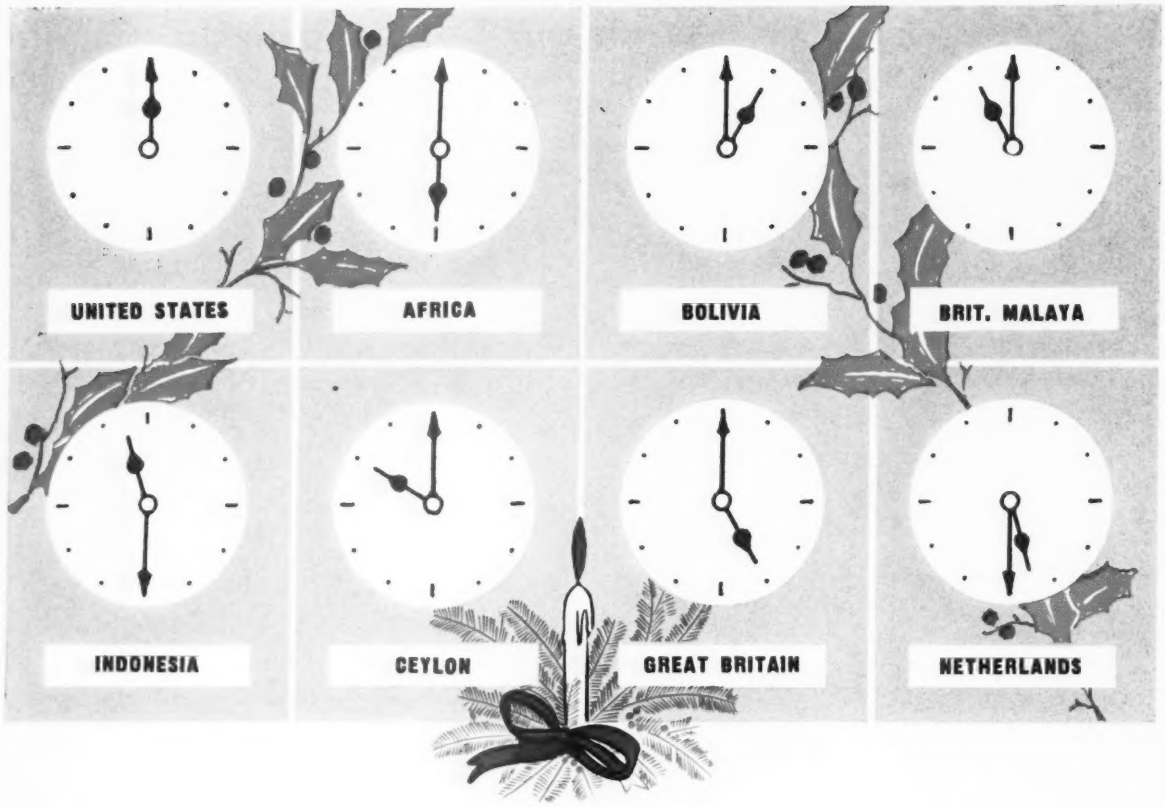

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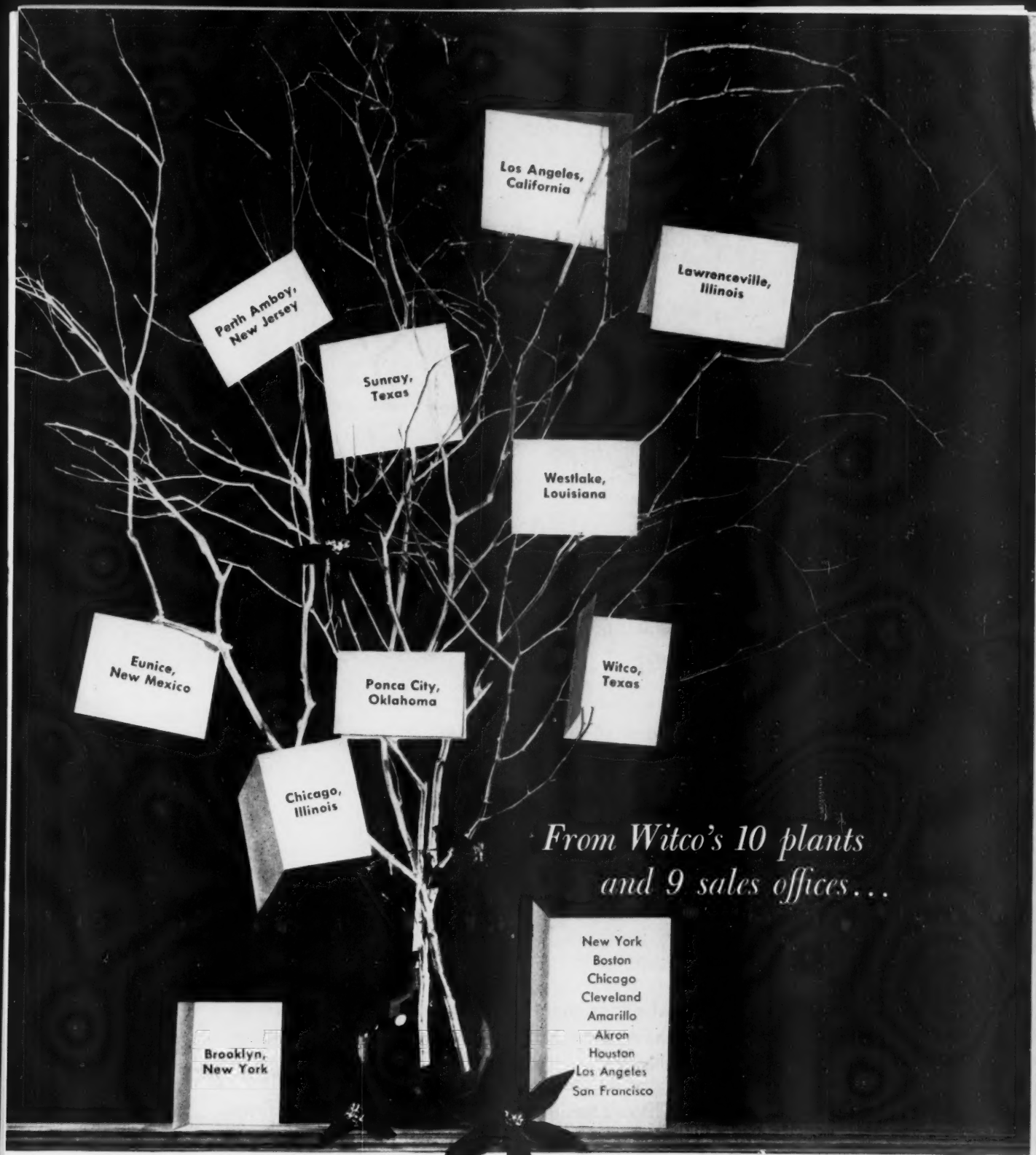

season's greetings and best wishes for the new year.

Witco Chemical Company
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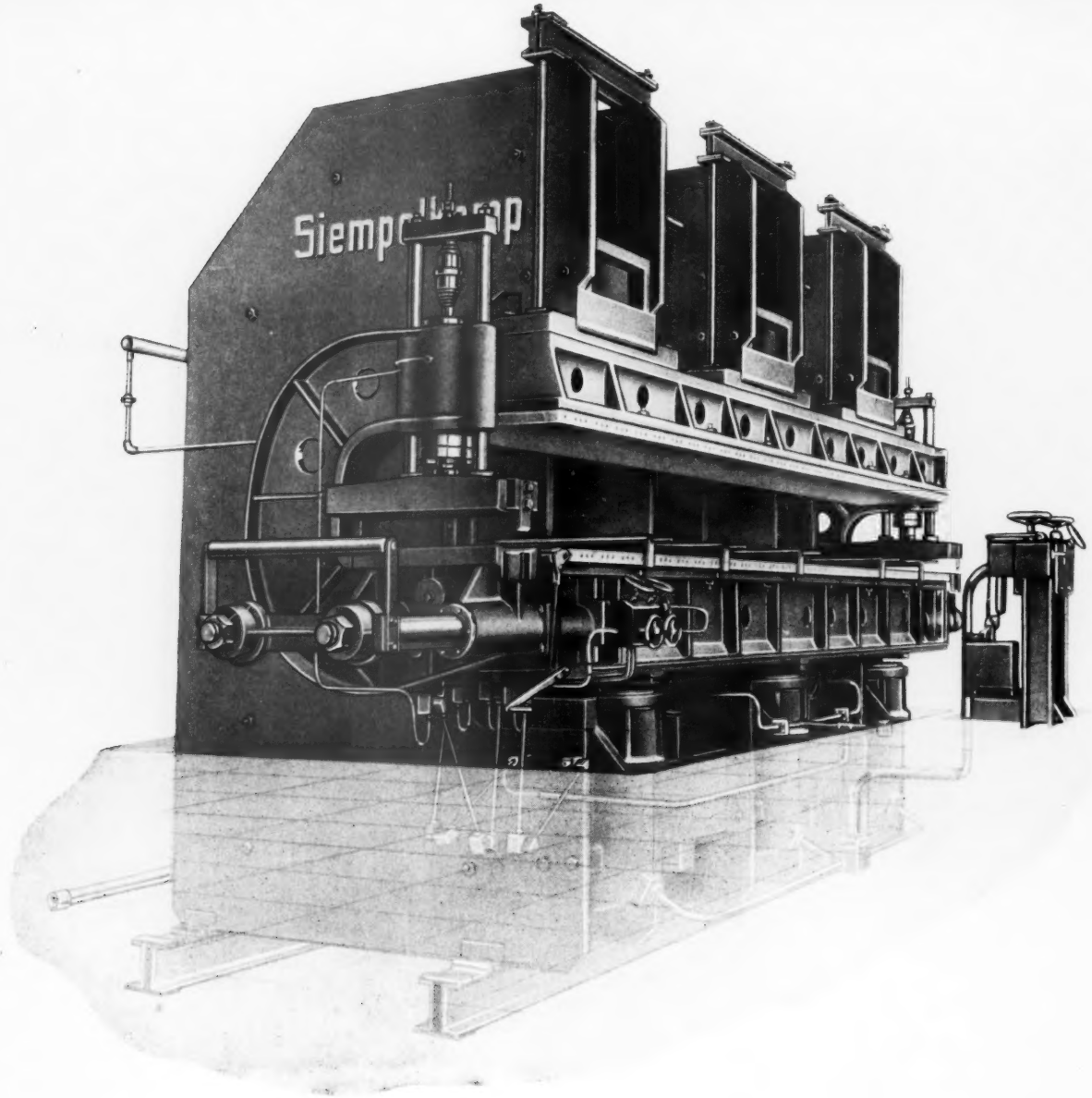

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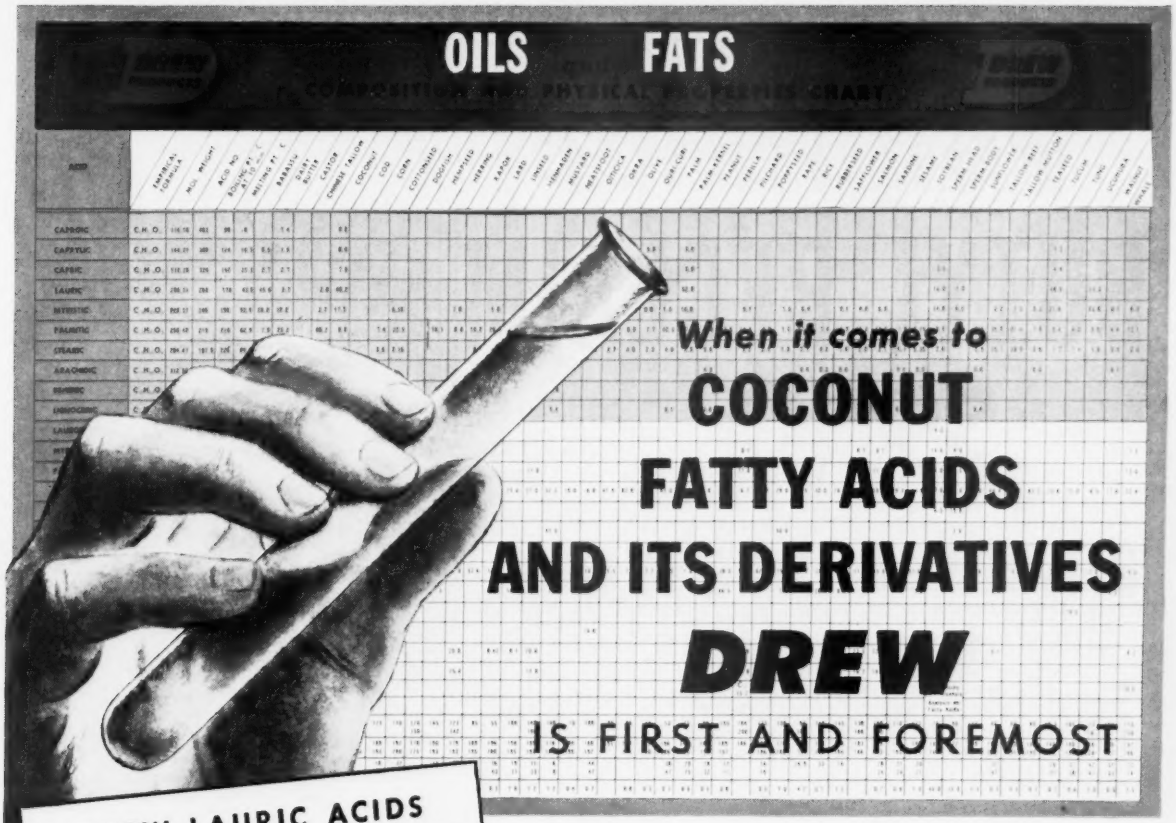

DREW LAURIC ACIDS

APPROXIMATE CHEMICAL COMPOSITION	AAB %	ABL %	AB %	ABH %	AAAR %
Caproic C6	—	—	—	—	—
Caprylic C8	2.0	1.5	1.0	1.0	1.0
Capric C10	4.0	3.5	3.0	3.0	2.0
Lauric C12	90.0	79.0	60.0	60.0	45.0
Myristic C14	2.0	13.0	18.0	18.0	22.0
Palmitic C16	—	8.0	7.0	7.0	11.0
Stearic C18	—	1.0	1.0	8.0	2.5
Oleic C18	2.0	3.0	7.0	3.0	11.0
Linoleic C18	—	—	3.0	—	5.5
Linolenic C18	—	—	—	—	—
APPROXIMATE CHEMICAL DATA	**AAB**	**ABL**	**AB**	**ABH**	**AAAR**
FFA	139-144	138-141	126-132	126-132	116-126
TITRE °C	37.0 Min.	30.0 Min.	24-28	29	30.0 Max.
IODINE VALUE	3.0 Max.	5.0 Max.	8-16	3.0 Max.	14-22
ACID VALUE	277-287	275-281	251-263	251-263	232-253
SAP. VALUE	277-287	275-281	251-263	251-263	232-253
COLOR	15.0/2.0	20.0/3.0	20.0/3.0	15.0/2.0	35.0/5.0

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Sp. Gr.	1.34
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Silene L is chemically the same as Silene EF, but the "L" grade is controlled to produce a uniform material of lower free moisture content. Special moisture-proof packaging prevents rapid regain in storage. Silene L was originally developed specifically for the vinyl film market but some rubber producers now find it preferable in their regular operations.

Silene L is not claimed to be a simple cure-all. It has performed better in some stocks than in others; results have likewise varied with the types and ages of equipment used by compounders.

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Bulk Density	12 lbs./cu. ft.
Specific Gravity	2.1
Average Particle Size	0.030 micron
Color	White
Refractive Index	1.47
Oil Absorption (Rub-In Method)	120 gms. oil/100 gms.
Surface Area	80 sq. meters/gm.
pH in 5% Water Suspension	10.0
Loss at 105°C.	4% or less
Loss on Ignition	15%
SiO_2	64%
CaO	18%
Fe_2O_3	0.15%
Al_2O_3	0.6%
MgO	0.1%
NaCl	1.5%

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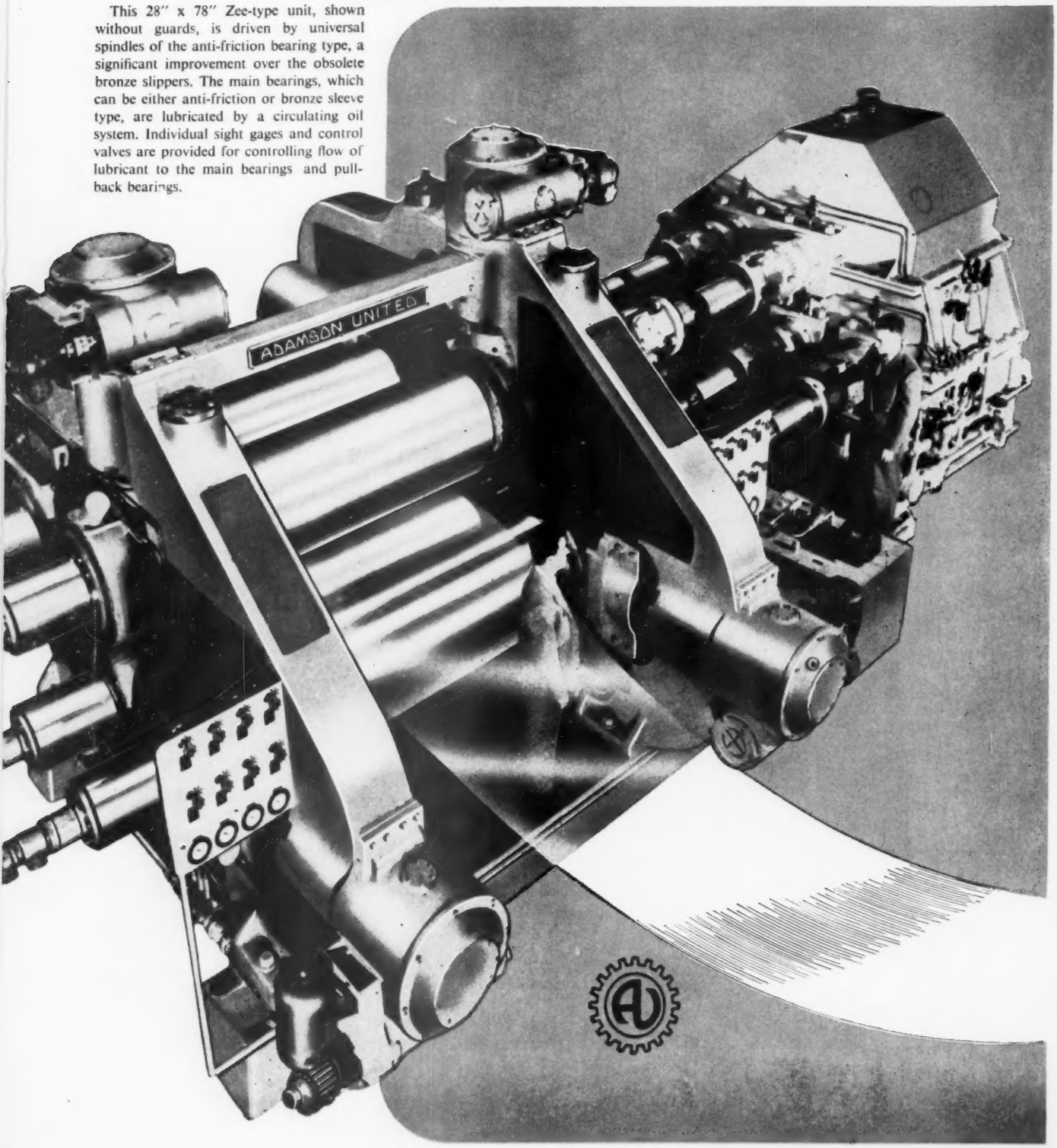
* ANNOUNCING a new ADAMSON UNITED.

This 28″ x 78″ Zee-type unit, shown without guards, is driven by universal spindles of the anti-friction bearing type, a significant improvement over the obsolete bronze slippers. The main bearings, which can be either anti-friction or bronze sleeve type, are lubricated by a circulating oil system. Individual sight gages and control valves are provided for controlling flow of lubricant to the main bearings and pull-back bearings.



...Zee-Type

PRECISION

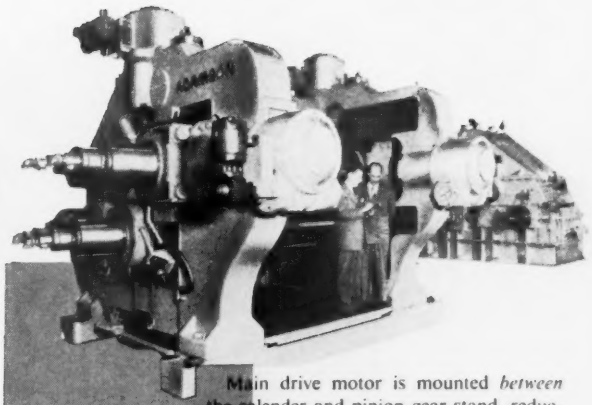
CALENDER

The new Adamson 4-roll calender is a completely modern Zee-type unit, especially designed for double-coating tire cord or producing two-ply laminated material. The improved features available on this unit greatly increase the accuracy of calendering operations, and assure a more uniform product with substantial savings in material. Higher production speeds can be obtained; and crown compensating equipment provides uniform transverse gage under varying conditions of operation.

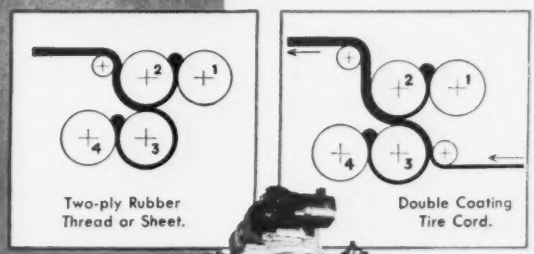
This high-speed unit incorporates a separate pinion gear stand which encloses all drive gears and connecting gears, driving the rolls individually through universal couplings. The peripherally drilled rolls are accurately controlled by a pressurized circulating water temperature regulation system.

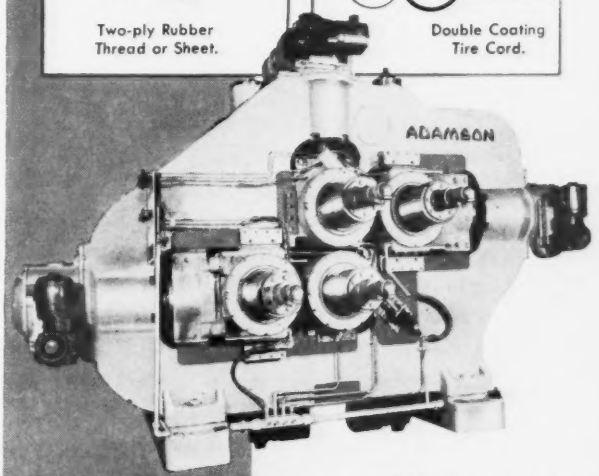
In addition to the unit shown, a modified calender, incorporating crossed axis equipment on only the #1 or the #4 roll is available for plastic film or sheeting. Adamson also manufactures a 24″ Zee-type calender, along with a special 6-roll double Zee-type unit.

We invite your inquiries.

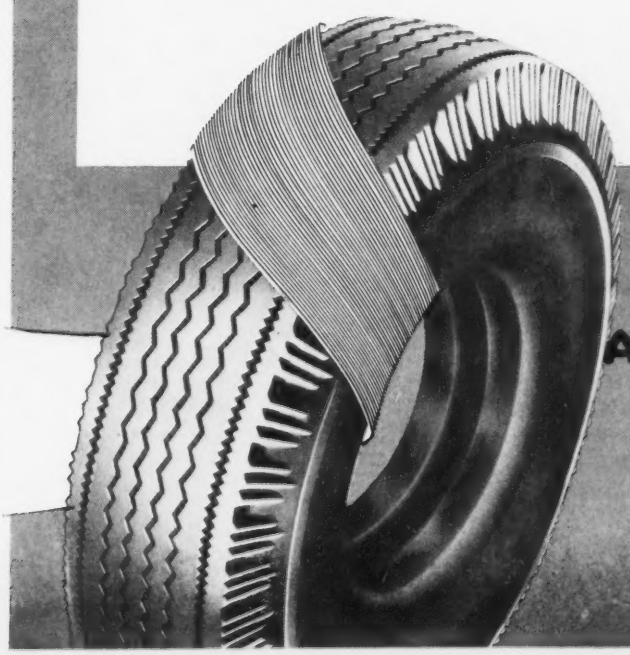


Main drive motor is mounted *between* the calender and pinion gear stand, reducing overall length significantly. Gage adjusting equipment is unitized construction, assuring positive alignment, with double enveloping worms and worm gears mounted in anti-friction bearings.





Both offset rolls (#1 and #4) are "crossed" in the vertical plane by motorized adjustments allowing operator to compensate for deflection of the rolls. The operator can add or subtract crown, in effect, by changing the amount of crossing of the two offset rolls with respect to the two stack rolls. Selsyn equipment and counters are provided for indicating the exact vertical position of each end of the crossed rolls.



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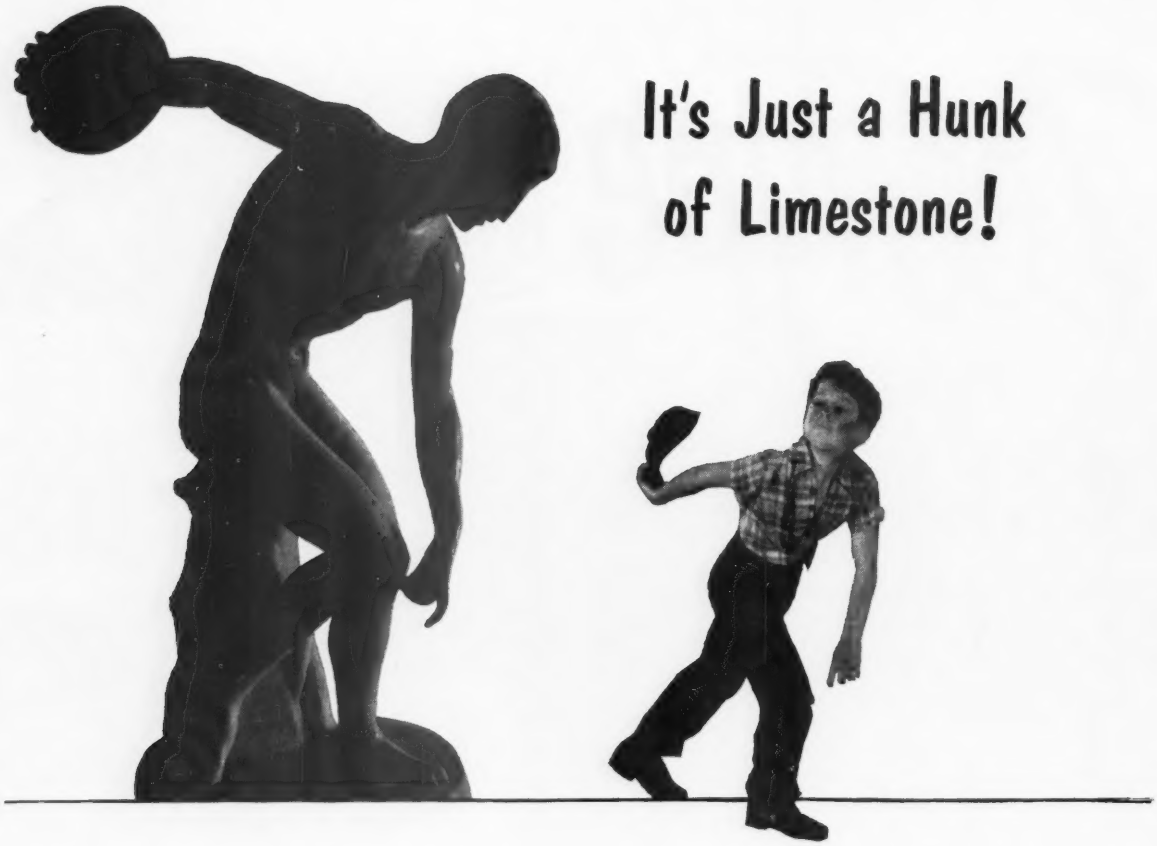

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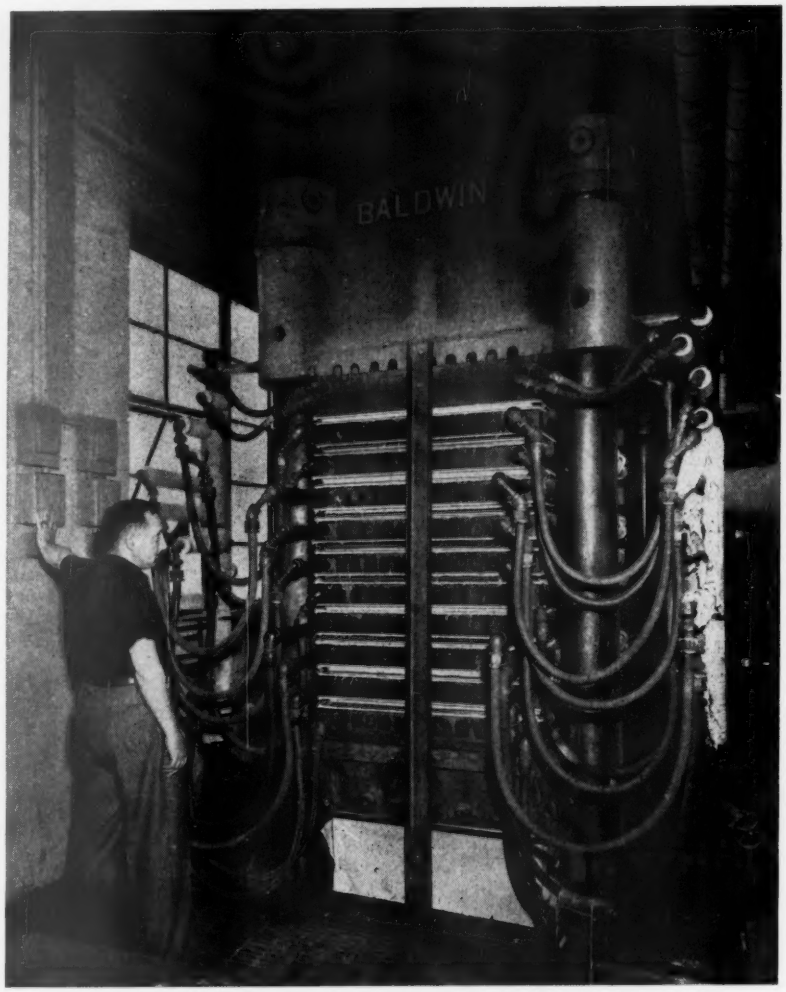

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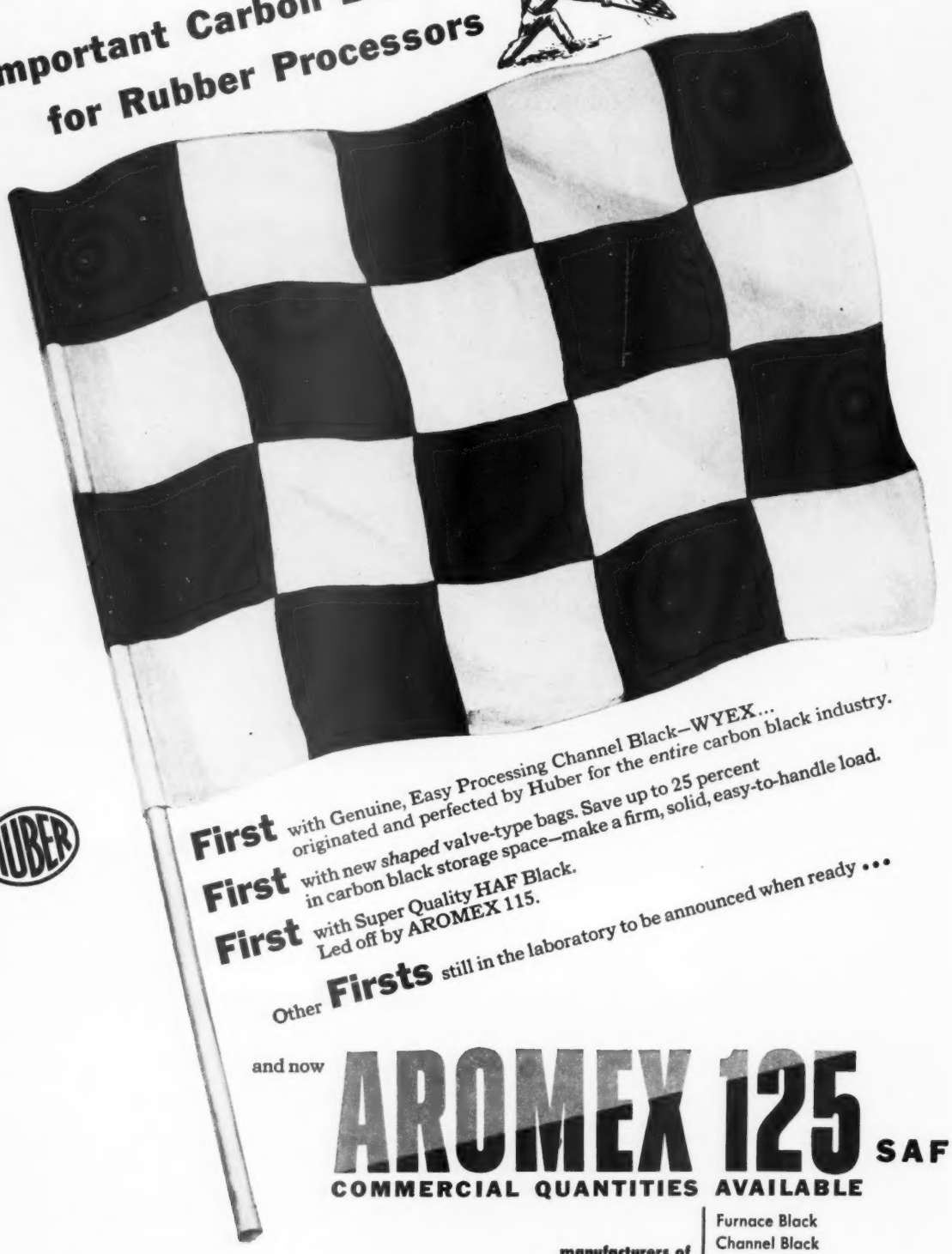

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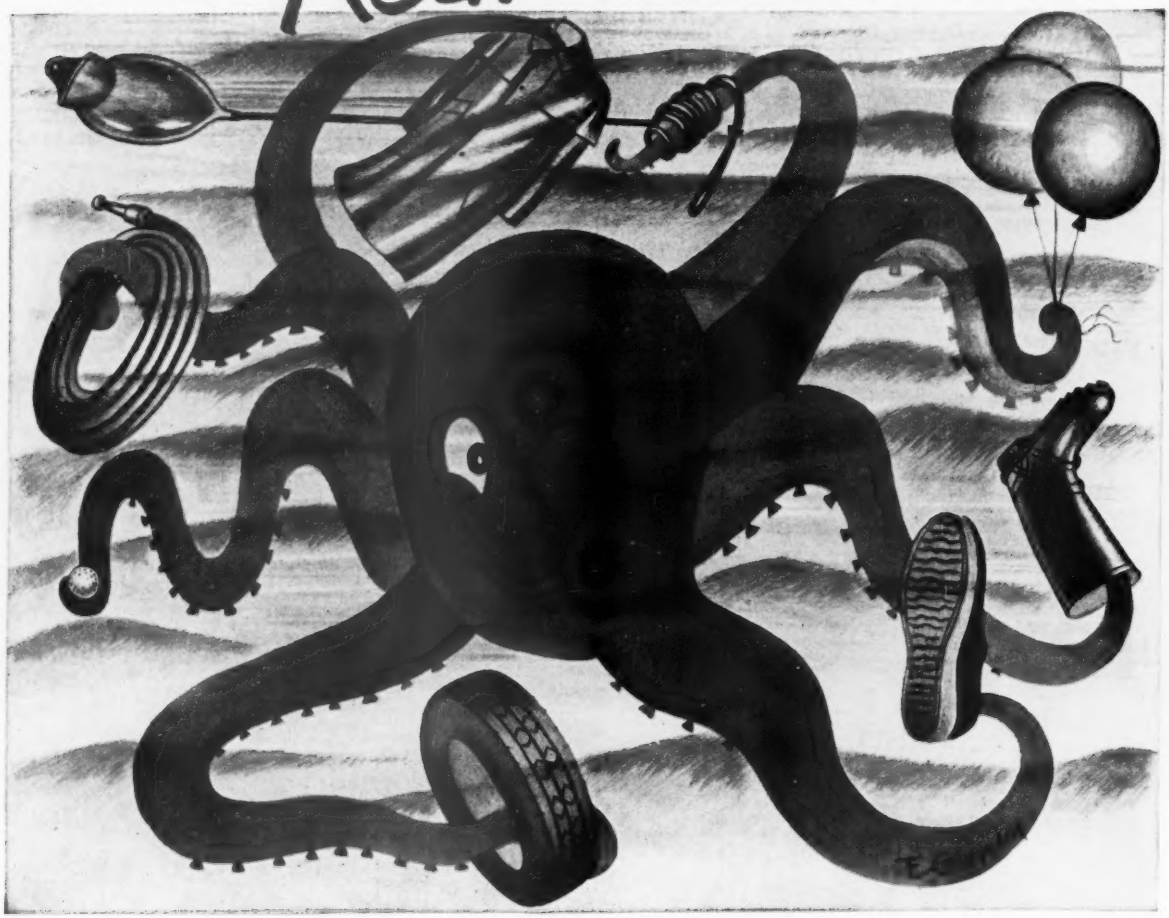

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RUBBER AGE

Vol. 74, No. 3 DECEMBER, 1953

Current Problems in Shipping Natural Rubber

An Account of the Problems Presently Besetting Shippers, Carriers, and Consignees, together with Suggestions for Improving Conditions

By CAPTAIN M. W. ALLEN

President, Marine Surveys Co., 8 Bridge St., New York 4, N. Y.

Although rubber manufacturers are vitally concerned with natural rubber, few of them have a working knowledge of the trials and tribulations involved with the packing and shipping of this commodity. Fewer still have any conception of the problems faced by the carriers in transporting the rubber over thousands of miles of ocean and delivering it to various docks in the United States. The accompanying article, written by an expert who has been handling shipments of rubber for many years, should prove of interest to every rubber manufacturer. Some of the data he will find of direct interest and some of an academic nature. Since all of it is concerned with his basic manufacturing material, he will profit from an understanding of the problems involved and some of the attempts being made to solve these problems.—EDITOR

THE shipment of natural rubber during the postwar period has brought a number of new problems to the shippers, the carriers, and the consignees. Through mutual cooperation many of these problems have been solved; however, there still remain some major and minor problems confronting all three parties concerned. With these problems in mind and with the firm conviction that they exist due to a lack of understanding, we shall attempt in this article to discuss the over-all situation in general as it pertains to rubber shipments from the Far East.

There has been little change brought about in the actual preparation of the various grades of rubber in the past 15 to 20 years, but where the packaging of rubber for shipment is concerned the picture has almost completely changed. Prior to World War II the majority of rubber shipments were packaged in burlap covers or wooden cases. Today, we find that the shipper packages his rubber, for the most part, in bare-back bales or, in the case of some crepes, with only burlap patches on the ends of the bales. Ceylon rubber still utilizes burlap covers (reused burlap for the most part), and while this type of packaging eliminates some shipping problems it presents others.

The trend toward bare-back baling has an economic background. Shippers and importers, confronted with mounting problems involving extra labor, cost of wooden cases and burlap, extra freight costs, heavy handling damage during transit, and handling and disposal problems at the factory, to name a few, decided upon bare-back packaging. The material, due to its very nature, assisted in eliminating some problems which would have been impossible of solution with others.

Bare-back packaging, achieved by compressing R.S.S. or crepe into a compact bale and either wrapping with rubber sheets of the same grade or banding with lock

metal bands, solved approximately 80% of the difficulties encountered by shippers and importers. However, it marked the beginning of trouble for the ocean carriers due to the fact that the bales were now subject to damage as a result of direct contact with water or other foreign elements, plus the fact that rubber has a tendency to stick to itself. For a time this presented more of a problem than did the possibility of wetting by either rain or salt water while the rubber was in the carrier's custody.

Immediate Postwar Problems

During the period directly after World War II some ships were delayed in unloading as much as 5 to 15 days due to the bales adhering to each other. Many claims as a result of rubber sticking to other bales, fused and blocked conditions, loss of identity, and adherence of wood slivers and other foreign matter were paid by the underwriters and the steamship companies.

For the most part these conditions were due to the type of packing and the tacky and gummy condition of the rubber itself, rather than the type of stowage aboard various vessels. Had the bales been covered with burlap or wooden plywood, as in the past, 95% of the trouble would have been eliminated. It took some time for the carriers to meet and cope with this situation. Shippers were starving for cargo space and ship owners were unaware of the problems until they were literally stuck with them.

Some of the troubles apparent in the shipping of rubber in the three-year period immediately following World War II, as outlined above, were gradually overcome. One of the most important factors in overcoming these difficulties was the resumption of activities in the field by the Rubber Manufacturers Association, Inc., and the Rubber Trade Association of New York, Inc. These organizations helped to bring about better conditions by revived and revised packing specifications and renewed interest in rubber imports.

In our opinion, the renewed interest of the R.M.A. and the R.T.A. in packing conditions, and closer inspection of arrivals by factory representatives, were paramount factors in the improvement of arrival conditions. We form this conclusion due to the fact that other than water damage the major trouble is misshapen and tacky bales of rubber. These conditions, we have found, are due to the packaging and preparation of the rubber. The tighter the pack on the bales of rubber the better the outturn, provided due diligence is used in stowage.

The ocean carrier in this changing period found himself faced with new problems of stowage. In the period immediately following the end of World War II, vessels were stowed to the deck head and hatch beams with bales of rubber. On the C-2 and C-3 type vessels this means a height of approximately 13 to 15 tiers in the lower holds and 5 to 8 tiers in the 'tweendecks. This means, in turn, that the rubber on the bottom tiers of stow in the lower hold would be misshapen or pressed down to a certain extent.

In the case of bare-backed bales which were not tightly compressed it meant a decided flattening of the bales. Some came out in the form of elephant ears or badly distorted and misshapen bales. Where these bales were allowed to come in direct contact with the vessel's frame and metal parts, badly distorted shapes resulted and some bales had to be cut or pulled apart in order to be discharged from the vessel.

In order to overcome the stuck rubber situation the carriers relied upon an abundance of talc between the bales or tiers. This, however, did not solve the problem as native labor did not talc the bales evenly. In addition, excessive use of talc caused labor objections in the United States and also obliterated the marks on the bales, making some shipments shortdelivered.

It was also determined that the misshapen condition frequently noted in the tiers of stow was not all due to pressure in stow but in part had existed prior to loading in the ocean carrier. Flat bark crepe and some of the remilled crepes were found to give the greatest cause for concern. These crepes, due to their tacky and gummy condition, caused the majority of the stuck and adhering conditions aboard ocean carriers.

Prior to the institution of revised R.M.A. packing specifications it was noted that bales of flat bark crepe would become stuck to each other and to other bales of R.S.S. or crepe even in the top two tiers of stow in any cargo compartment. This was definitely not due to any pressure but rather to the nature of the rubber itself.

Many cargo surveyors have been faced with claims for damage on flat bark crepe. When they called at the piers they would frequently find the shipments fused and blocked in clusters of 2 to 20 bales. The breaking apart of these bales carried out by the importer and/or carrier represented an added cost. Not only was it a cost feature, but in breaking apart the bales in stow or after discharge to the pier, the identity of the bales was often lost, or the bales no longer represented bales in appearance, size, or weight.

FIG. 1—View of crepe bales with well marked burlap end patches. When these patches are lost it is difficult to identify the bales.

Change in Flat Bark Crepe Packaging

The Rubber Manufacturers Association, through various importers, brought about a change in the packaging of flat bark crepe through the use of new or used hessian or burlap as an outside wrapper and metal strapping of the bales. Straw matting covers were tried but abandoned because such covers adhered to or became embedded in the rubber. The hessian or burlap wrappers eliminated approximately 80% of the troubles of the ocean carriers in lost time and expense concerned with fused rubber, non-deliveries and damage to other shipments.

New problems of a minor nature arose from the adoption of the burlap or hessian covers as factory claims were made for lint adherence or embedding of the metal straps in the rubber. They also meant additional cost for pier inspection. The factory claims, unless undue stow pressure had been experienced, fell into the lap of the shippers' representatives and were not recognized by the ocean carriers.

Some of the lower blanket crepes above the grade of flat bark have been found to be offenders at times. This is mainly due to a combination of pressure and an inherently lower quality condition in which the crepe is often found to be gummy and tacky. The percentage of claims for damage against the importer or carrier is low but cannot be overlooked at any time. For the carrier it means constant supervision and attention with regard to training ships' officers and shore personnel, and from the importers' view it means closer inspection of shipments after arrival on the piers. The problem of inspections will be dealt with later.

According to a New York newspaper covering the rubber "seminars" conducted in recent months by the Rubber Manufacturers Association, over 41% of the rubber imported into the United States last year was off-quality. The problems that confronted the carrier with regard to stowage as a result of poor quality will be discussed later.

Captain M. W. Allen was born on March 11, 1915 at Fairport, N. Y., and was graduated from Newark High School, Newark, N. Y. Upon graduation from the New York State Merchant Marine Academy he received an unlimited ocean license in January, 1938. He was then employed as an apprentice pilot on the Illinois River for the Ohio River Co. In June, 1938, he joined the U. S. Line as Junior Officer on the "S. S. Washington". He served as fourth, third and second officer on U. S. Line vessels until the outbreak of World War II, at which time he joined the Grace Line, Inc. Here, he became Master and commanded troopships and cargo vessels in all theaters of operation until 1947. In that year, Captain Allen left the sea and joined a New York surveying company. In this capacity, he served as steamship company and underwriter surveyor until April, 1953, when he formed his own concern, the Marine Surveys Co. He now serves as expert and consultant on stowage of cargo and the handling of various commodities.

Importance of Proper Bale Markings

During the period of government control and high-priced rubber the problem of non-deliveries was of great concern to both ocean carriers and importers. Thousands of dollars were lost as a result of non-deliveries and the greatest burden fell on the shoulders of the ocean carriers inasmuch as they were unable to properly identify and deliver all of the bales or shipments carried. These conditions stemmed from two different causes: (1) lack of or unreadable markings on the bales, and (2) inability to properly consolidate in one batch or location on the pier. The poor markings on the bales were, in our opinion, the paramount cause of the inability to identify the bales.

At first, the markings on the bales were found to be inconsistent in size and formula, easily obliterated or destroyed by either handling, stowage or by light wetting. It is our belief that the lettering on R.S.S. as to marks and grade should be stenciled on the top and bottom flat of the bales, with the grades definitely marked full size on the ends of the bale. The previous practice of having a small rubber patch approximately 10 inches square stuck on the end of the bales was, in our opinion, a good one. The patch was cut with diamonds or other symbols to denote the grade, i.e., 3 diamonds—3 R.S.S., and even though the head marks were obliterated the bale could be recognized by grade. We have witnessed many deliveries due to the patch marks alone. With few exceptions, no matter how badly distorted, crushed or how wet the rubber patch, bales marked with end patches could be identified by grade. Thin pale crepes are found to be well marked for the most part and suffer few casualties. However, we believe the head marks and lot numbers could be of larger size and thus easier to identify.

Thin pale crepes probably outturn better on an overall basis than do any other grades of rubber shipped. The package holds its shape well and the markings, as well as the type and color, are distinctive and assist in sorting and deliveries. Thick pale crepes with burlap covers very seldom create any problem insofar as poor markings are concerned

Thin brown crepes wrapped with crepe wrappers and marked on the wrapper sheets are also victims of obliterated marks due mainly to the poor marking of the bales. Also, due to the fact that the bales are not tightly compressed, the outside wrapper sheets are sometimes torn in handling and the marks lost. Insofar as we can determine, the paint used for the marking has a tendency to erase more quickly on thin brown crepe than on other bales; this may be due however to the rough surface as against the smoother surfaces characteristic of R.S.S. bales. Part of this difficulty could be overcome by using larger sized marks.

Amber and smoked blanket crepes with their burlap end patches sort and deliver well, except in those cases where the patch or end burlap comes loose under the bands and is lost during the handling. The burlap patches bear the head mark or identity and when the patches are lost the bale is unidentified (Fig. 1). It might be in order to mark the bales or bands outside of the burlap patch with a colored paint of some kind to further identify the bale. For the most part we do not consider this a difficult problem and feel that as other problems are solved this one will work itself out.

Variety of Water Damage Claims

Water damage probably causes more claims to be paid by underwriters and carriers than any other type of damage known. Water bleaches the rubber and makes it vulnerable to mould. Insofar as serious damage is concerned water damage does not often fall into this category, and it can be said that over 90% of all water damage claims paid by both the underwriters or carriers are due to a light rain wetting only. Then, the reader may wonder, why does water damage rank third or fourth in claim value? The answer: For the simple reason that very few people are actually in possession of the facts as to where it was wetted.

Rainstorms in the Far East are much like our showers in the southern states except during the rainy season when they are of longer duration. Bales of rubber are stored in godowns (warehouses) and trucked to

piers for loading or are hauled by lighter down the rivers to the piers. These methods of handling expose the rubber bales to wetting during transit to the piers or ships.

We believe that more rain wetting is experienced during transit aboard lighters than in any other form of transportation used in conveying rubber to the pier or ship. We base this conclusion on the fact that for the most part the bales are exposed to the weather for longer periods and that the type of coverage is usually less adequate and in poorer shape or condition.

Rain wetting on the trucks outside of the rainy season is hardly noticeable when the rubber is received by the carriers' representative, especially where the bales have been subsequently dried by the sun. Rain wetting in the lighters often falls under the same category and ships' officers very seldom note bales of rubber that have been wetted and dried off.

Some of this is understandable inasmuch as the stains found by inspectors in the states are more or less definite, whereas the stains may be only a slight discoloration prior to stowage in the vessel. We believe that confinement in stow produces a darker stain that often cannot be detected before loading. It definitely does increase the mould spores inside or on the wrapper sheets (Fig. 2). We wish to emphasize, however, that this condition does not relieve the carrier and his representative from properly inspecting the bales of rubber before or during loading.

A wetting condition on bales of brown crepes, blanket crepes and smoked blanket crepes is especially difficult to determine, particularly if the bales have been dried off and show no definite stains. This is due to the open condition of the books or sheets and the fact that the water will penetrate further into the inside of the bale. Burlap-covered bales of either R.S.S. or crepe are also difficult to spot for wetting unless the outer cover is wet or heavily stained, due mainly to the use of second hand burlap covers. For some reason unknown to legal minds, it has become accepted by carriers' representatives that a reused burlap cover which is definitely dry-stained can be accepted for shipment with a notation such as "second hand" or "reused" covers. It is true that a good reused burlap is often dry-stained and does not necessarily denote damage to the contents, but on the other hand, who is qualified to say when or where?

Tightly packed and sized bales of R.S.S. show less water penetration or inside damage as compared to other types or grades of rubber. This is due mainly to the tight packaging and the sizing or coating on the outside covers on the bale. Loosely packed bales of R.S.S. are very susceptible to water damage and for the most part the damage is greater on the inside than would be suspected from the outside appearance.

FIG. 2—Group of water-damaged ribbed smoked sheet bales showing both mould and stains. Water damage is a major source of claims.

The Problem of Ships' Sweat

Eliminating the possibility of ships' condensation (sweat) and rain wetting during loading or in the square of the hatch, we feel that the possibility of a wetting by salt water or other ship conditions is approximately 1 to 6. A wetting by salt water entry or from the ship's own water supply through breakage or accident represent the more serious types of water damage to bales of rubber because of the greater quantities of water involved. The carriers, we have found, are quick to act upon damages of this description, both in notifying the consignees and in making necessary corrections. The wetting by ships' sweat, so far as we can determine, is not of serious proportions. The period in which this damage occurs usually covers the last part of October and the early part of April.

We do not believe that it is within the province of the steamship companies to entirely prevent ships' sweat, although they can do much to assist in modifying it by proper ventilation. We estimate the loading temperature of rubber to be in the range of 80 to 85° and a block stow (solid stacking) of rubber tends to decrease temperature very slowly regardless of the consistent air change over the surface of the stow. We have noted bales of R.S.S. upon arrival which still showed temperatures of approximately 76 to 79°, although the hatches had been opened for 48 to 54 hours in temperatures as low as 20 to 30°. The conditions outlined indicate that the formation of ships' sweat by the dew point being reached on a vessel's metal parts due to warm inside temperatures and cold to extreme adverse temperatures outside is a very likely condition during the winter months. There is very little likelihood that any new systems of cargo ventilation will be brought into use which can completely eliminate this condition during the winter months.

Special Treatment of Sole Crepe

Before discussing the different types of stowage and other suggestions or opinions, we wish to insert a few words about the little shipped, but important rubber commodity known as sole crepe. These shipments are prepared for a special purpose or trade and although low in volume are high in value. Once this crepe is damaged its loss is over 80%.

We have found that although sole crepe is packed in wooden cases, breakage and stains are common causes of rejects and claims. Believe it or not, this condition is actually credited to the fact that the rubber is packed in wooden cases. Due to the case packing and the light weight involved, heavy handling and poor stowage are the main causes of damage. Water damage seems to be negligible, so far as we can determine, and apparently the cases offer more protection against the elements. Damage as a result of foreign matter sifting into the cases either in stow or during handling, along with stains

as a result of handling broken cases with contents exposed, are the major difficulties where shipments of sole crepe are concerned. Some improvements are in order as to the packaging on the shippers' side, but most of the reforms are the responsibility of the carriers.

Damage as a result of discharge and pier conditions is of minor importance, but still should be given consideration for improvement. We have found that the cases of crepe suffer more casualties during discharge as a result of breaking out from stow than do bales of R.S.S. This occurs mainly as a result of the bands becoming broken and the contents being partly lost or becoming unidentifiable. The number of bales which fall into the water during discharge does not average over 4 or 5 bales on a 5,000 ton cargo.

Fresh water wetting on the pier as a result of rain entering through side doors, roofs, or other inlets have reached moderate proportions on some of the poorer conditioned piers in the New York port area, especially during the winter and spring seasons. The privately-owned piers seem to effect repairs and lessen the possibility of these wettings more than do other piers.

Handling of Rubber on the Docks

Having been safely carried and discharged to the pier, the bales of rubber or shipments are placed into storage locations awaiting delivery. This is accomplished by the use of sorters, hand truckers, hilo fork lifts, cranes with net slings, and labor for tiering. This is a crucial period in the handling of the rubber shipment because if the selection as to marks is not properly made and the bales are not placed in their assigned location the possibility of non-delivery and claim is strong. The decisions of the sorters are influenced by stowage or hatch sheets (check sheets) and condition and appearance of the bale are paramount factors. It can easily be seen at this point how important marks are in determining the selection. Stains, misshapen conditions or badly distorted bales, and bales with foreign matter adhering all add to the final headache at this point.

Attention is invited again to the fact that bales of R.S.S. are harder to sort by grade or marks than any other type of rubber. Once the marks are obliterated on R.S.S. it usually takes a certified weigher or rubber man to cut and grade the rubber (see Fig. 3).

Because a large proportion of scoop deliveries to the trucks is made by hilo fork lifts during pier deliveries, we find that bales that are tiered in error with other marks or shipments have very little chance of being properly identified. It has been noted that bales of other piles and marks often fall victims during truck loading by the scoop method. The hilo with scoop method has gained popularity in the Port of New York mainly from the cost standpoint, since it eliminates a good deal of hand labor. We feel that better supervision on the part of checkers, dock bosses and location men is in order in this instance, since improved supervision will result in fewer mis-deliveries.

Problem of Cross-Delivered Bales

At this point we would like to mention another cause of loss or cross-delivered bales which is directly due to the inspection of the rubber by the importer's representative on the piers. Certified weighers, in the course of their inspections, during which they open and close various lots of rubber, often lay these bales out on the pier, covering a moderate amount of pier space. Through carelessness and generally through no fault of the inspector, the laid out bales often become mixed in other

FIG. 3—Fire-salvaged rubber which has been washed and dried. Once marks are obliterated it is very difficult to properly grade the rubber.

shipments or marks and are wrongly delivered. If bales are mixed, say a No. 3 R.S.S. in a mark or grade consisting of No. 1 R.S.S., the importer's representative will refuse to take delivery of the wrongly marked bale and will throw it out. If the situation is reversed—a No. 1 R.S.S. for a No. 3 R.S.S.—well, we will leave that to the reader's imagination. The value of a good dock boss who knows his rubber and pier conditions can well be stressed at this point. From the importer's side, the value of a rubber inspector who is attentive and understands his job, aside from examining the rubber for grade, quality and condition, can be appreciated.

The cost of processing this kind of claim is no small drain on the importer, underwriter or carrier, and an ounce of prevention at this stage is well worth a pound of gold. One well-known surveying firm through constant attention to short deliveries has saved the underwriters and the carriers thousands of dollars and it is not improbable that this figure is now close to the million dollar mark. This is just one example of how it pays for importers, underwriters and carriers to employ qualified men who can solve these everyday problems.

A constant complaint made by carriers is their inability to deliver bales of rubber due to the obliteration of the sub-marks which indicate the grade of rubber. We refer, for example, to a mark such as JUG^{H} or JUG^{U} which could mean a No. 4 R.S.S. and a No. 3 R.S.S. If the bales become distorted or misshapen, it may be very difficult for the pier sorter to determine whether or not the "H" is an "H" or a "U" and vice versa. The chances are that the No. 4 R.S.S. will be delivered before the No. 3 R.S.S., because the consignee will not have to worry about getting lower grades and subsequently having to pay a differential for off-grades to his ultimate buyer, and the bales which are not clear as to marks will be opened and graded by a second or third buyer who will find the rubber to be off-quality. Time to properly examine bales on the pier is limited, since time is a money factor and frequently determines whether the carrier will show a profit or loss. Therefore, the proper marking of bales is important to both the carrier and importer.

Suggestions for Improved Markings

It has probably occurred to the reader by now that if the rubber bales are properly separated in the hatches they should be similarly separated at the time of discharge to the pier, thus eliminating the sorting problems on the piers referred to above. Unfortunately, this condition does not exist for a number of reasons. In the first place, very few shippers or carriers in the Far East have complete control over the loading situation, the reasons for which are too numerous to mention and are not of direct concern to this report. Secondly, the loading and discharge of the bales of rubber is very seldom carried out tier for tier or block for block. During the discharge it is much easier and faster for the longshoremen to break down 4 to 6 tiers and to tumble the bales down into the nets or drafts. This, of course, means a mixture of bales already more or less mixed in stow and delivered possibly at several different locations on the pier.

The first step toward the solution of this problem would seem to be better marking on the bales so that they can more easily be identified. We suggest that instead of the smaller letters used as sub-marks a more positive method be used where the sub-marks would be of equal size and of such a description that they could not be mistaken even though the bales were distorted. The most uniform system of marking which has outturned better under all conditions is that originated and used by one of the larger rubber importers. Their large symbols, such as a red half circle, etc., denoting consignee and grade, is very seldom obliterated or undistinguishable no matter what conditions the bales are subjected to. The symbols, which cover both R.S.S. and crepes, were quickly learned by the pier sorters and personnel. Insofar as we can determine there have been very few shortdelivered bales for this importer due to these special marks, except those which were actually shortlanded ex the vessel. We are also of the opinion that these shipments are better handled in preparation for loading aboard vessels due to the fact that the various lots are found to be more consolidated in stow aboard various ocean carriers.

FIG 4—Bales of Technically Classified (T.C.) rubber. These bales are marked with colored circles and bars to indicate properties of the rubber.

The fact should be stressed that the importer mentioned above actually operates his own plantations and can exercise better control over the entire movement. The majority of the non-deliveries and problems seem to fall on the small shipper who has little organization.

In recent years an effort has been made by producers of natural rubber to identify bales of rubber according to the processing characteristics of the rubber itself, of specific interest and help to the compounders. Known as Technically Classified Rubber (T.C.R.), these bales are marked with a blue, yellow or red circle and with a blue, yellow or red bar, each circle and bar and each color having a definite designation. A T.C.R. bale is shown in Fig. 4. As indicated, the purpose of the code system in this instance is to indicate the technical quality of the rubber, but if a similar code were adopted for different grades of rubber it would go a long way toward solving many of the problems currently facing carriers and importers.

Both the Rubber Manufacturers Association and the Rubber Trade Association have specific suggestions for bale markings. These include grade marks (8-inch characters), firm marks (5-inch letters), lot identification marks (5-inch numbers), etc. In our opinion, these requirements are not sufficiently adequate to cover the conditions to which rubber shipments are normally exposed. We believe that the size of the grade and lot identification marks, in lieu of standard symbols on R.S.S., should be not less than 12 inches in size and the firm marks not less than 10 inches. We believe that use of standard symbols or designs is a two-way protection in identifying grades or lots whenever the sides or ends of the bales are distorted so as to prevent quick and easy determination of the lot or grade marks. It is our opinion that the use of letters to indicate lot numbers is a poor practice inasmuch as the letters often become obliterated or distorted in such a manner as to be mistaken for other letters used in the shipment.

Difficulties Due to Pilferage

Another problem which has caused some concern in the rubber trade is the pilferage of rubber from solidly packed bales in several of the Far East ports. Discovery of the pilferage usually is not made until the bales are weighed or examined after discharge in the United States port. If the importer does not call for examination and weighing of his lots by a certified rubber examiner these losses often go unnoticed even at the factory. Fairly accurate reports show that the port in which the greatest amount of pilferage takes place is Singapore.

So-called "bandits" operating at Singapore gain access to the rubber shipments, particularly those which are waiting transshipment, remove part of the rubber and reseal the bales for shipment. The work is so cleverly done that unless the bales are closely examined they escape detection. These light weight bales usually indicate a shortage but with various shippers occasionally shipping bales of lighter weight to make up a certain over-all weight on a shipment light weight is not a true indication of pilferage. Examination of the bales, however, will usually show that the marks on the bale will not completely coincide, particularly where the wrapper sheets join to the bale or where they cover over part of the marks that were stenciled on the bales. Frequently, the two-pronged jabber which punctures the wrapper sheets is used to seal the bale after part of the contents has been removed. Many of the bales show shortweights from 20 to 80 pounds; at an average of 20 to 25 cents per pound one can easily see what pilferage on 5 to 10 bales of a shipment would amount to in claim value.

The constant examination of rubber shipments by qualified steamship and underwriter surveyors and by certified rubber inspectors or weighers has proved to be of untold value and is directly responsible for many changes which have been brought about to better over-all shipping conditions.

Some of the major problems involve the trader-importer who buys rubber to trade or sell and does not use the rubber he brings into the country. This is mainly due to the fact that these importers as a rule do not have pier representatives or examiners and actual damage or conditions are difficult to arbitrate where only one side has knowledge of the situation. The importers in such cases, place claims with their underwriters. It is seldom possible to bring the two parties together for a joint examination or for the settling of any dispute.

Effects of Seasonal Conditions

Before finishing this portion of our report, a word should be said about seasonal conditions. During the winter months, rubber bales landed on the piers tend to become stiff or hard and appear to be frozen. A special problem presents itself at this time because the bales can be opened and examined only with great difficulty. The inside of R.S.S. bales have the appearance of bleached or virgin rubber and until the bales are warmed up sufficiently it is difficult for the examiners to determine the extent of damage, if any. We have known of some cases where claims were made and allowances secured for rubber which was actually sound in all respects, but simply seemed to be off-quality because of cold conditions. Many examinations are poorly and inadequately carried out during the winter months.

Another of the seasonal conditions that is of some concern to the carriers is what is known as "self-sweating" on the piers and occasionally in the vessel itself. During cold weather, as has been mentioned above, rubber becomes stiff and hard and on days when warm or humid weather follows the cold, bales of rubber of all descriptions and grades have been noted to sweat heavily on the piers. In fact, on a number of occasions all bales on a pier have been noted to be very heavily wetted with actual puddles of water laying on the top flats of the bales. The actual cause of this condition is the dew point being reached on the surface of the bales, the same as when a can of beer is taken out of a refrigerator into a warm room. There is no way in which the carriers can prevent this sweating unless it is required that all piers be steam heated during the winter months. Even so self-sweating would still occur, either during or after transportation by the importer and after storage in unheated warehouses.

We do not feel that the extent of damage caused by this condition reaches any great proportions, but we have seen damage caused similar to rain wetting and also marks on bales become obliterated to such an extent that the bales of rubber were undeliverable. On one occasion we noted self-sweating of bales of rubber in the upper 'tweendecks where the vessel had been opened for discharge at several ports during cold weather. Upon discharge at the final port the bales were still wet and the cargo (importer's) surveyor claimed a wetting aboard the vessel as a result of snow, which did not occur although it had snowed at one of the discharge ports. We might add that the surveyor had good grounds in this instance inasmuch as the bales of rubber in the lower holds, still warm, did not show evidence of sweating. It was only by actual examination of the cargo in stow that the carrier's surveyor knew what had occurred. What argument can the carrier's claim manager offer to dispute a claim unless he has all of the facts? We feel that this is another of the many examples that show the practical value of qualified surveyors and rubber examiners.

FIG. 5—Distorted bales of rubber such as those seen in this photograph present special difficulties when stored in warehouses prior to shipment to rubber manufacturers.

In the foregoing we have attempted to outline a number of the problems currently facing shippers, carriers and consignees. It should be evident that cooperation among all three would do much to solve many of these problems. In the balance of this article we will review rubber stowage aboard vessels and offer some suggestions as to some steps which can be taken by the carriers to better the over-all situation.

Suggestions for Proper Stowage

Prior to the discussion on stowage we wish to offer the opinion that because variations in packaging methods for shipment and handling have altered radically the carriage of a number of commodities we feel that the average ship's officer is not always armed with the latest information regarding the situation. This condition is no fault of his own making, but rather is due to the speed with which the changes have taken place. We believe that every steamship company, regardless of its flag, should institute a cargo claims prevention organization which will act as a liaison group between the claim departments and ships' masters and officers in order for the latter to better understand all of the problems involved.

The types of stowage we shall deal with are mainly those common to vessels of the C-2 and C-3 types, although stowage is basic on all ships.

We believe that the carrier first should look into the condition of the bales of rubber at the various ports. Some sound arrangement should be established in which the actual condition of the rubber is determined and reported on prior to the point at which it arrives alongside the vessel for loading. This is a matter which should concern the carrier's representative or agent as much as the freight commission to be earned. For example, we refer to loading at Saigon where most of the rubber is transported to the port by lighters approximately every two weeks for shipment aboard ocean carriers. Who determines whether the bales of rubber are sound, stained, damaged or misshapen? Certainly not the ship's officer

FIG. 6—View of average bottom 6 tiers of stow in a lower hold. Note the misshapen condition of the ribbed smoked sheet bales.

who is loading five hatches at one time and is either forward, midships or aft! This situation could possibly be remedied if the carrier placed a deck officer in each of the hatches, although the cost plus U. S. Coast Guard regulations might be prohibitive.

It is reasonable to assume that the 10 to 20 days on lighters does not improve the condition of the rubber and we know that the misshapen condition as well as water damage often found in sound stow has frequently existed prior to loading at Saigon. Although ships' officers have been alerted to some extent, a good deal of this damaged rubber is getting past both ship and shore personnel. The greatest damage, as far as carriers are concerned, is in the misshapen bales.

The reader may be wondering why this constant emphasis on misshapen bales and what do misshapen conditions have to do with rubber claims. There are two excellent reasons why misshapen rubber is objectionable: First, because the handling and tiering of misshapen bales both on the piers and in importers' warehouses (Fig. 5) presents problems of lost time, injuries and loss of valuable storage space, and second because competition from the well-packaged synthetic rubbers has brought pressure on the natural rubber importer. In order to meet this new competition, the rubber importer must have bales which are more or less uniform in shape as well as being up to grade. Carriers can be of special assistance to shippers and importers in this connection.

We have found that on a two 'tweendeck and lower hold vessel, such as a C-2 or C-3, the stowage in the forward section of the No. 1 lower hold and the after section of the No. 5 lower hold present greater problems than any of the other cargo compartments. The main reason for this is the fineness of the vessel's hull at these locations. Other causes are the heavier sweating of the skin of the vessel, and the inability to properly floor rubber and to lay dunnage. Breaking out of the bales from stow is also found to be more difficult from these locations. It generally means that bales are dragged out over the top of other bales, thus increasing the possibility of obliterating marks and mixing of the various shipments during discharge.

Where possible the forward section of the No. 1 lower hold and the aft section of the No. 5 lower hold should be stowed with other type cargo. When this is not possible it is advisable to floor with a solid floor of dunnage preferably laid fore and aft on each four tiers of stow. Prior to the stowage outboard against the battens, care should be taken to see that all battens are in place and that insofar as possible, particularly in the bottom tiers, pieces of dunnage should be laid in between the sweat battens, forming a more or less complete sheathing against the frames. If it were not for the carriage of other cargoes which need greater circulation of air over the surface of the stow we would recommend a complete sheathing of these areas.

More misshapen and stuck bales of rubber have been discharged from these locations than from almost all other locations of the vessel combined. Blanket crepes, thin pale crepes and thin brown crepes stow fairly well in the locations mentioned above. If at all possible, flat bark crepes should not be stowed in these locations, even though they may be covered with burlap or straw. Due to the pitching motion alone there is a greater settling of the rubber regardless of grade or quality.

More thought must also be given to the ventilation of the No. 1 and No. 5 lower holds due to the heavier sweating on the skin of the vessel. We have found that where proper ventilation is not provided there is a moderate to heavy mould formation on the wrapper sheets of the bales adjacent to the sweat battens.

At this point we would like to interject some comments on hatch temperatures which are pertinent to the ventilation problem. Hold temperatures vary according to the type of vessel but as a rule these temperatures will range

FIG. 7—Another view of an average bottom. Note the neat appearance of the crepe bales which are stowed on the flat in the background.

FIG. 8—Bottom stow bales of ribbed smoked sheet are seen in this photograph. The original stow was only 11 tiers high.

from 70 to 118°. It is safe to say that very few ships actually show temperatures of more than 85 to 95°. With proper ventilation, neither the No. 3 hatch adjacent to the engine fire room or the No. 4 hatch adjacent to the engine room and with the shaft alley running through it cause any special heat problem, especially if properly dunnaged. However, due to the large exposed deck surface at the No. 5 hatch on most ships, temperatures of approximately 118° have been recorded in the after end of the No. 5 T.D. when the sun has beaten down upon the deck for long periods of time in the Far East or in the Persian Gulf.

We believe that two separate types of blowers or fans should be used in the No. 5 hatch, one to pull the air in and circulate it in that hatch and one to suck the air out. In our opinion, the exhaust system is superior to the intake system. The two systems do not have to be operated jointly but can be operated independently according to the conditions experienced or desired.

Flooring of the decks and ceilings in the lower holds is a necessity which cannot be eliminated, in our opinion, since it prevents contamination with foreign matter and damage resulting from sweat and small amounts of water which might find its way into the hatches.

The height of bales of rubber in the upper 'tween-decks averages 5 to 8 tiers depending on the kind of rubber to be stowed. There is no need for dunnage to be used except on the deck under the bottom tiers of stow. The weight of the bales, approximately 180 to 250 pounds each, is not sufficient to cause any problems of crushing or distortion in the upper 'tweendecks. We do suggest, however, that if at all possible the bales of crepe, with the exception of flat bark, be used as the bottom tiers of stow, and that in the case of estate thick and thin brown crepes, thick blanket crepes and smoked blanket crepes, which are banded and shipped with a burlap patch on the ends of the bale, these bales be stowed on the end or burlap patch instead of on the flat. In this way the bale outturns with less chance of sticking and in better shape. We have seen bales of thick blanket crepes stowed under 10 to 12 tiers of rubber in the lower hold outturn in better shape than bales of ribbed smoked sheets.

To better illustrate some of our suggestions and recommendations we are including several photographs taken of actual stowage of rubber bales. Figures 6 and 7 show the average bottom 6 tiers of stowage in a lower hold. The compressed and misshapen conditions of the R.S.S. bales as compared with the bales of crepe is

FIG. 10—Crepe bales stowed on end in the bottom tiers of a 13 tier stow. The good condition of these bales is evident.

evident in these photographs, despite the fact that the crepe bales are stowed on the flat. Close observation of these photographs will indicate how some of the more solidly packed R.S.S. bales retain their shape as against the more loosely packed bales.

Bottom stow bales of R.S.S. are shown in Figures 8 and 9. Note the scored and misshapen condition in an original stow only 11 tiers high. Also note the bales of bottom tier crepe stowed on end in the background. The better condition of crepe bales stowed on end in the bottom tiers of a 13 tier stow is clearly evident in Figures 10 and 11. A comparison of "one end" stowage as against on-the-flat stowage can be made by closely examining both of these photographs. For the record, the discharge time for the bales of crepe shown in Figures 10 and 11 was less than one-half that required for the R.S.S. bales shown in Figures 8 and 9. Figure 12 shows bottom tier bales of R.S.S. both scored and with foreign matter embedded in the bales.

The average height of bales of rubber in the lower 'tweendecks runs from 6 to 10 tiers. Here again, as in the upper 'tweendecks, we do not advise the use of dunnage except under the bottom tiers of stow. We do advocate the use of 2 tier dunnage, commonly referred to as cross plank dunnage, instead of just a single tier of fore and aft or athwartship dunnage. The paramount factor in laying dunnage is to have the layers of dun-

FIG. 9—Another view of bottom stow bales of ribbed smoked sheet. Note the bales of bottom tier crepe stowed on end in the background.

FIG. 11—Another view of crepe bales stowed on end. A comparison of "one-end" stowage as against "on-the-flat" stowage can be made from this photograph.

nage as close together as possible in order to present a more or less solid floor. This will prevent distortion and scoring of the bales and assist in handling during discharge from the vessel.

It may some day be necessary to dunnage with a solid floor of single fore and aft or athwartship dunnage on the 5th tier of stow in the lower 'tweendeck, but so far such dunnage is not considered essential. The less dunnage used in between the tiers of stow the fewer problems, particularly in speeding up the discharge of the rubber. Athwartship dunnage seems to be easier for the longshoremen to work with, particularly if the bales are adhering to each other, because longshoremen generally work from center outboard instead of in a consistent fore and aft direction.

Selection of Proper Dunnage

Attention is drawn at this point to the selection of the dunnage to be used in rubber stowage. It should be dry, clean dunnage, free from any oil stains, dirt or other foreign matter, because as a rule it will come in direct contact with the rubber itself. Green dunnage has not presented any great problems so far as we can determine; however, soft and rough planed dunnage which splinters or which breaks easily has caused embedding on a number of shipments. For the most part this condition is serious enough to cause reconditioning charges after discharge to the pier, at approximately $1.25 to $2.50 per bale.

Caution is advised in all of the cargo compartments with regard to the covering of the vessel's metal parts with dunnage in order to prevent distortion and stains to the bales and to prevent their coming in contact with warm bulkheads. Although dunnage is essential in these respects it can be poorly used to the detriment of the carrier.

The lower hold stowage in all vessels presents more difficulties than any of the 'tweendecks due to the greater height and weight of the stow. The average lower hold stow reaches a height of 15 tiers but for the most part does not exceed 11 to 13 tiers, depending on the type or grades of rubber to be stowed.

We suggest that two tiers of dunnage be used over the tank tops or ceilings, the bottom tier fore and aft, and the top tier athwartship; this facilitates drainage to the after drain wells. It is our opinion that a solid flooring on the 6th or 7th tier up from bottom of the stow is sufficient to distribute the weight of the stow and assist in quick dispatch during discharge.

Very little heat damage has been noted on any vessels in the after sections of the No. 3 lower hold or the forward end of the No. 4 lower hold, even as a result of direct contact with the engine room or fire room bulkhead. It appears however that there is a greater settling of the rubber, particularly of R.S.S. bales, in these locations and in order to provide better ventilation we suggest that where possible a space of 8 to 9 inches be left between these bulkheads and the original stow. This will reduce to approximately 4 to 5 inches at the end of the voyage in most cases.

The curve of the bilge in the lower holds should be built up wherever necessary in order to prevent distortion and difficulty in discharging from the hatch.

Due to part stowage of rubber between ports, i.e., forward or after section in the lower holds, it has often been found necessary to lay dunnage athwartship on every two tiers of stow adjacent to the open end of the bulkhead in order to prevent the bales from shifting and falling down upon other cargo or into empty spaces. This type of dunnaging should not extend more than 2 or 3 tiers fore or aft in from the end of the stow and should be laid athwartship where possible. We have in the past recommended the use of cargo nets secured by wires or metal straps extending from the shell plating to the opposite shell plating over the face of the stow in order to hold the bales in place between ports, thus eliminating the use of additional dunnage.

Stowage in any of the deep tanks calls for special supervision by the ship's officers due to the unbattened frames, heating coils and steel gratings. These parts must be well dunnaged in order to prevent distortion, sweat damage and stains from oil-coated tanks, the oil being used as a preservative. Inasmuch as the height of stow is approximately the same as in the lower holds, we suggest that the same dunnaging procedure be used as in these holds.

Up to this point we have discussed only the basic steps to be followed. We now wish to point out additional stowage conditions, which cannot always be met, but which are highly desirable.

Due to the adhesive qualities of rubber itself, admitted by the shipper and importer in talcing and sizing his own commodity, attention must be paid to these qualities as well as to the shape of the bales. It is essential that all ships' officers engaged in the trade know something about the rubber they carry. It is only through a working knowledge of the rubber that they can hope to stow it in such a manner as to successfully compete with other carriers and avoid claims.

The description of the various grades of rubber according to their market value and importance is as follows: No. 1X Ribbed Smoke Sheets, No. 1 R.S.S., No. 2 R.S.S., No. 3 R.S.S., No. 4 R.S.S., No. 5 R.S.S., No. 1X Thick Pale Crepe, No. 2 Thick Pale Crepe, No. 3 Thick Off-Color Palish Crepe, No. 1X Thin Pale Crepe, No. 1 Thin Pale Crepe, No. 2 Thin Palish Crepe, No. 3 Thin Off-Color Palish Crepe, No. 1X Thick Light Brown Crepe, No. 2X Thick Brown Crepe, No. 3X Dark Brown Thick Crepe, No. 1X Thin Brown Crepe, No. 2X Thin Brown Crepe, No. 3X Dark Brown Thin Crepe, No. 2 Thick Blanket Amber Crepe, No. 3 Thick Blanket Amber Crepe, No. 4 Thick Blanket Amber Crepe, No. 1 Thin Light Brown Crepe, No. 2 Thin Light Brown Crepe, No. 3 Thin Brown Crepe, No. 4 Thin Dark Brown Crepe, Standard Flat Bark Crepe, Hard Flat Bark Crepe, and Smoked Blanket.

To summarize or condense these grades, it is only necessary to keep in mind the following: No. 1X and No. 1 R.S.S., No. 1X Thick Pale Crepe, No. 1X Thin Pale Crepe, No. 1X Thick Light Brown Crepe, No. 1X Thin Brown Crepe, No. 2 Thick Blanket Amber Crepe, No. 1 Thin Light Brown Crepe, Smoked Blanket and Flat Bark Crepe. For a complete description of the various grades of rubber we suggest that those who are interested obtain a copy of the pamphlet titled "Type, Description and Packing Specifications for Natural Rubber" issued by the Rubber Manufacturers Association. Once a ship's officer has familiarized himself with the various grades and characteristics of the several natural rubbers mentioned above his task will become somewhat easier.

Conditions of Ideal Stowage

We feel that if it were possible it would be advisable at all times to stow bales of thick and thin pale crepes in the lower holds or thick and thin brown crepes in the bottom 4 to 5 tiers of stow, with R.S.S. making up the center and top tiers of stow along with the amber blankets and flat bark crepes. The ideal stowage would be to stow the flat bark and amber crepes in the top 2 to

4 tiers. This ideal condition can only be carried out with the complete cooperation of the shipper, agent and carrier in preparing the rubber for shipment. The main reason for this suggested stow is to prevent distortion and adhering of the bales of rubber during ocean transit. It also minimizes obliteration of the bale markings.

In the lower 'tweendecks we feel that the ideal stowage calls for thick and thin pale crepes or thick and thin brown crepes in the bottom 2 to 3 tiers of stow with R.S.S., amber blanket crepes and smoked blanket crepes making up the center and top tiers. Here again we believe that soft flat barks should be given the top tiers of stow even if they are covered with burlap or matting covers. It should be mentioned that there are two grades of flat bark crepe, i.e., standard flat bark crepe (soft) and hard flat bark crepe, which can be stowed with little distortion or trouble. Both of these crepes react differently to pressure and heat of stow. However, as a general precaution it is better to handle both grades of flat bark on the same basis as other crepes and thus prevent any problems through mistaken identity and stowage.

In the upper 'tweendeck no special consideration must be given to stowage by grades of rubber. Here the bales of R.S.S. can be stowed 5 to 6 tiers high as in the godowns without worry of distortion. It is good practice, however, to stow the crepes other than flat bark on the bottom tiers and the R.S.S. and flat bark crepes in the center and top tiers.

We realize, of course, that all of the suggestions mentioned above cannot be followed due to the fact that at some ports of loading all of the different kinds of bales or grades mentioned are not available, and also that limitation of loading time, weather and native labor conditions will act to prevent their being followed. We have found, however, that where the ship's officers were informed of ideal conditions the results were most encouraging.

Application of Separator Materials

The use of different separators, i.e., talc, paper or plastics, between the bales of rubber to prevent adherence and obliteration of marks is still largely in the experimental stage. It is our opinion that if bales are stowed more or less as discussed above, separating agents are not an absolute necessity. We base this upon the fact that all R.S.S. according to R.M.A. recommendations should be painted on all six sides with one coat of bale-coating solution. If this is done properly there is no special need for the use of any other composition or material to prevent adhering and obliteration of marks unless the latter are wet stained. When coated bales have been found to stick in stow it has been due largely to the settling of the rubber and distorted shape, rather than to the adhesive qualities of the rubber itself.

Thick and thin pale crepes with either burlap or rubber wrappers have not been found to adhere or to stick together unless an unusual amount of heat has been encountered and can, therefore, be considered safe and good stowage bales or packages. Estate thick and thin brown crepes, thick blanket crepes and thin brown crepes, which for the most part are not rubber-wrapped bales but are strapped with metal bands and have burlap patches on the ends, will not adhere to each other unless they become very tacky due to poor preparation or if they are stowed on end or patch to patch. If they are stowed on the flat, it would take approximately 1 to 1½ inches of talc to prevent their adhering to one another due to pressure when a tacky rubber condition exists.

FIG. 12—Bottom tier bales of ribbed smoked sheet which are scored and which have foreign matter embedded in the bales.

The openings between the sheets or books of the bales can be likened to fingers which would reach into the other bale openings so that these spaces would have to be filled if talc was to do any appreciable good. Not only is talc ineffective in this instance, but the additional labor cost in discharging and cleaning the holds is becoming prohibitive.

Coated papers used as separators have not proved too successful up to the present. Adherence to the paper has been noted in the case of tacky No. 3 or No. 4 smoked blanket crepe and other low grade rubber. Another undesirable feature of the coated papers is that they will definitely adhere to bales of rubber if the bales are wet or damp at the time of loading and stowage. This definitely forms a basis of claim against the carrier, at least for reconditioning. In the past few months the manufacturers of these coated papers have greatly improved the product and have developed many desirable features. However, the past experience of the carriers makes them reluctant to carry on further experiments with these separators.

In the past, the cost of the paper used on an average rubber carrier was approximately $1600 to $1800, which is born by the carrier and is an added expense. We would like, however, to make this point: The carriers that spent these sums were not familiar with the various grades of rubber or conditions inasmuch as they used the paper throughout the stow, which was costly and unnecessary. Had they known their grades of rubber and conditions they could have eliminated much of the paper and the cost.

The use of plastic film (polyethylene) has proved fairly satisfactory as a separator material, although initial tests conducted by carriers with the material were far from encouraging. As a matter of fact, one of the first tests with polyethylene made by an ocean carrier was classified as a complete failure. This may have been due to the fact that the technical properties of the polyethylene, such as its melting point and its heat resistance, were not properly understood, and its use resulted in fusing and adhesion to the rubber bales. It is also possible that pressure and temperature conditions in the stow were partly responsible. Subsequent tests, made at the request of various organizations, during which polyethylene was subjected to both heat and pressure, proved that the polyethylene pulled free from rubber

bales after storage and did not show any evidence of breakdown.

One definite feature in favor of polyethylene as a separator material is its lack of adhesion regardless of the degree of wetting as a result of wetted bales coming in contact with the plastic material. If polyethylene does not prove to be a fire hazard of any kind, we believe that it can be of definite assistance in the stowage of the softer and tackier grades of rubber. It is of passing interest to note that the use of polyethylene costs the carrier between 4 to 5 cents a bale, which on a 50,000 bale cargo represents a substantial cost.

Experiments have also been conducted with sized cotton sheathing covers for separating purposes. It was found, however, that although no special problems were occasioned by the bonding of the rubber to the covers themselves, the light weight cotton was forced and pressed into the bales, thus bringing claims of impurities. Because of this fact, the use of inexpensive cotton covers, which it was hoped might replace the heavier burlap covers, was discontinued.

We believe that polyethylene as well as the coated paper separators all have a part to play in the stowage and good outturn of natural rubber bales. We wish to add, however, that carriers should familiarize themselves with the specific characteristics of the various separators available and use each where it can do the most good. In any event, these separators as a rule do a better job than does talc, and generally have some scrap value after use. Talc, of course, is a single-use material.

Some Miscellaneous Factors

Before leaving this subject we would like to insert a word of caution with regard to the use of talc. Talc frequently contains large particles and will not blend with talc containing smaller particles. When such blends are attempted the resulting mixture will frequently leave a stain on the rubber. Talc of 100 mesh is acceptable and any material that will not pass this screen should be rejected.

Ships' officers must exercise caution when stowing other cargo adjacent to bales of rubber. Cargoes such as pepper, niger seed, seedlac, shellac, tapioca pearls, etc., which may leak from their containers either during loading, transit or discharge can become embedded in the wrappers of rubber bales and get inside the bales themselves. These conditions will cause definite claims for reconditioning and damage. Wet cargo which may leak and cause damage cannot be stowed above rubber shipments.

Rubber latex is commonly shipped in drums or in bulk tanks. Surveys for the tanks are mandatory, and any surveyor will gladly explain the problems involved so we will not discuss the subject in this article. Rubber latex in drums, stows and handles well, although care must be taken to prevent heavy handling and leakage. One of the factors a ship's officer must take into consideration is that latex freezes at approximately 28°F. and when frozen becomes badly damaged.

Certain grades of rubber give off a smokey odor due to the curing method and this cannot be considered as an indication of damage. If, however, the rubber is found too odorous and gives off a fishy odor, it is probable that damage exists as a result of the rubber deteriorating through a wetting by water. Rubber stained by oily substances becomes soft and gummy but does not give off any strong odor.

Care must be taken to avoid the stowage of any grade of baled rubber in small spaces such as lockers, reefer boxes, or deep tanks (found in the No. 5 lower hold of C-3 vessels), due to the greater possibility of distortion and difficulty in discharge, plus the possibility of heat damage. Attention is also drawn to the fact that liquids such as carbon tetrachloride, sulfuric acid, turpentine, and gasoline will readily dissolve raw natural rubber.

Summary

An attempt has been made in this article to furnish a basic knowledge of modern methods of shipping natural rubber and to outline some of the problems concerned with such shipments. Although we have stressed some of these problems and have touched lightly on others, we have not covered all of the problems involved, since we feel that to attempt to cover every phase of the shipping of rubber would require a book or at least a very lengthy booklet.

In closing we should like to say that bales of rubber are for the most part uncovered and unprotected packages which have to be handled with special care by both shippers and carriers in order to outturn in good shape and with all marks clearly identifiable. Each package weighs approximately 180 to 250 pounds. If cased properly, such packages call for a construction made up of ½ to ¾-inch lumber, reinforced at the ends and properly strapped. Cases of such description could well stand a stow of 11 to 15 tiers in height.

Well compressed and tightly packed bales coated with a special size can also be well stowed, carried and outturned in good condition. Such treatment might well be the answer to a number of the problems. Good planning, supervision and increased knowledge of the rubber itself could readily furnish the remaining answers along with frequent discussions among shippers, carriers, importers (or consignees) and underwriters.

Magic Chemical Co., Brockton, Mass., has introduced the Magic Buffer, a new **power buffing tool,** which has many practical applications in factory operations. Originally developed to condition conveyor belts for applications of repair coatings, the buffer can be used to give a rough or matted surface to many materials, including iron, steel, fabrics, leather, wood and concrete. The unit fits into and is powered by almost any portable electric drill.

A new Model 28 **infinitely variable speed drive** has been announced by Graham Transmissions, Inc., Menomonee Falls, Wisc. The new unit has a number of important improvements over previous models, including 50% more power in approximately the same size, use of a two-piece housing with integral base, and improved control that provides linearity.

A new, compact, **quick detachable air connection,** said to provide almost complete free flow of air to air-powered tools, has been announced by the Binks Manufacturing Co., Chicago, Ill. This new connection, which is recommended for the air hose coupling on paint spray guns and other air-operated equipment, slashes pressure drop at the connection to only 5%.

Tire Temperature Measurement at the Government Tire Test Fleet

By V. J. HORNING

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Comprehensive articles covering the use of synthetic rubber in truck tires and passenger car tires, respectively, have appeared in our October and November, 1953, issues. Some of the results reported were based on a new method of determining tire temperatures which is reported to have several advantages over previous methods utilized. The new method, brief reference to which was made in the two aforementioned articles, is outlined in the current article.—EDITOR

IN 1950 it was requested that the instrument men at the Government Laboratories design and build a portable apparatus for measuring tire temperatures for the Government Tire Test Fleet. The previous method employed a millivolt-meter type portable instrument with a needle attachment for inserting into the tire treads. In order to obtain more precise tire temperature data it was agreed to obtain an electronic indicator and build special thermocouple injectors.

Procedure and Discussion

A panel (Figure 1) for housing the instrument and accessories was built, as it is necessary to transport the apparatus in the rear of a car. The instrument operates off a 6 volt D.C. power supply converted to 110 volts A.C. The range of the instrument is 0 to 300°F. with the dial graduated to 0.5°F. The instrument can accommodate 12 separate thermocouples, any one of which may be selected by the push buttons on the front of the panel.

FIG. 1—Instrument and accessories mounted in rear of automobile.

FIG. 2—Thermocouple and injector assembly.

The storage battery used for the power supply will operate the instrument about eight hours and then must be recharged such as overnight with a trickle charger.

The thermocouple and injector assembly (Figure 2) consists of a cylindrical housing 1 inch x 6 inches with screwed caps, a junction block in the center, a push-rod and handle with a hole through the center for the lead wire, and a needle thermocouple on the other end. The details of the injector assembly are shown in Figure 3. On the push-rod is a stop and lock-nut for setting the needle depth ¼ inch to 1¾ inches. The thermocouples are iron and constantan wire inserted in a 2½-inch long 15-gauge stainless steel hypodermic needle with the wire silver soldered to the tip—which is then ground to a conical point. The wire coming out through the handle is covered with a plastic protective tubing leading back to the instrument. The leads are 40 feet long to enable the operator to take the thermocouple completely around the truck to measure the temperature of the tires under test. Figure 4 shows the details of how the operator inserts the thermocouple in the tire.

Recently, an instrument capable of recording the different temperatures was put into service and is shown in Figure 5. This instrument plots the temperature on a

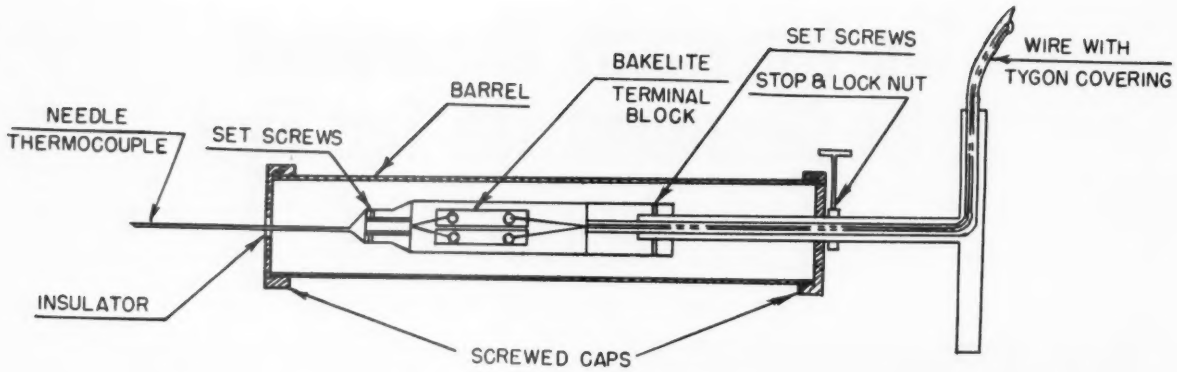

FIG. 3—Details of injector assembly.

strip chart. The operation is the same as previously described.

To determine the contained air temperature in the tube a specially designed T-adaptor is attached to the valve stem in a manner so that the air inlet extends perpendicularly to the extension of the valve stem and is equipped with a screw-sealing cap. Through the other opening of the T-adaptor are inserted thermocouple wires protruding through a gum rubber grommet held to the T-adaptor by a screw cap to seal the air chamber. The T-adaptor remains on the valve stem of the inner tube during road testing of the tire. In order to connect the thermocouple of the inner tube to the electronic indicator, a 40-foot extension line protected with the plastic tubing and equipped with alligator clips is attached to the wires extending from the T-adaptor.

To obtain the temperatures as close as possible to actual running conditions, the trucks are driven to the temperature station at full speed (45 m.p.h.) and stopped. The technicians then obtain 2 temperatures on each tire (2 tires) while the driver measures air pressures. About 70 seconds after the truck has stopped, the temperature measurements are completed.

FIG. 4—Operator inserting the thermocouple.

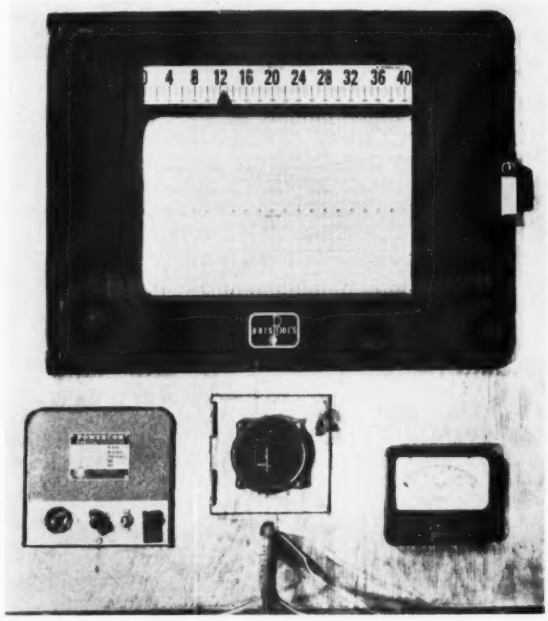

FIG. 5—Temperature recording unit.

Summary

The principal advantages of this equipment are:

(1) The greater speed that the instrument will indicate or record the different temperatures. The elapsed time to take one temperature measurement from the instant the needle thermocouple is inserted into the tire until the instrument reaches a balanced position is usually 2 to 3 seconds.

(2) The over-all accuracy of the present equipment is 0.1°F. which is far greater than obtained with the type previously used.

(3) The operator has complete control over the depth the needle thermocouple will be inserted into the tire. This fact alone will tend to give more uniform temperature data from tire to tire.

SPECIAL NOTE

The work discussed herein was performed as a part of the research project sponsored by the Reconstruction Finance Corporation, Office of Synthetic Rubber, in connection with the Synthetic Rubber Program.

The Reinforcement of Butyl with Carbon Black

Part III—The Action of Promoting Agents

By A. M. GESSLER and F. P. FORD

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THE first paper in this series (*1*) described the heat treatment of Butyl-carbon black mixtures and showed the improved vulcanizate properties which result from such treatment. Reinforcement was attributed to attractive forces between polymer and black, and evidence was given to support the proposition that heat treatment either modified these forces or produced them in additional quantity. The particular reactivity of channel blacks was demonstrated. It was shown that other types of blacks ("non-channel blacks") do not respond to heat treatment unless certain modifications are made either in the black or the compound. Modifications of the black were described in the second paper (*2*), which defined heat treatment reactivity in terms of the amount of oxygen chemisorbed on the surface of the black.

It is the purpose of the present paper to consider modifications of the compound. Chemical agents, such as sulfur and p-dinitroso benzene, have been found to promote the heat interaction of Butyl with non-channel blacks, and the use of these materials provides the means for obtaining greatly improved vulcanizates with either furnace or thermal blacks. This development is an important addition to the previous work (*1, 2*) because furnace blacks, with the growth of synthetic rubber, have assumed a prominent role among the reinforcing pigments used in the rubber industry.

Compounding and Heat Treatment

Masterbatches of Butyl and black were prepared conventionally in a Banbury or on an open mill according to the formulation in Table I. The promoting agent was added last, usually in a separate operation which was carried out under cool mixing conditions (6 x 12 inch mill; 0.040 to 0.045 inch roll clearance; 80 to 90°F. roll temperature). Masterbatches were heat-treated using methods which have already been described (*1*). Vulcanizing agents were then added, and the compounds, unless otherwise stated, were cured for 45 minutes at 307°F.

TABLE I—FORMULATION FOR HEAT TREATMENT STUDIES

Masterbatch	
Butyl Rubber (GR-I-17)	100.0
Carbon Black	50.0
Stearic Acid	0.5
Promoting Agent	Variable
Vulcanizing Agents	
Zinc Oxide	5.0
Sulfur	2.0
Tetramethylthiuram Disulfide	1.0
2,2'-Benzothiazyl Disulfide	1.0

Heat Treatment With Sulfur

Sulfur, like surface oxygen (*2*), is a promoting agent for the heat interaction of Butyl with non-channel blacks. Figure 1 shows the stress-strain properties of an SRF system conventionally mixed and after 12 cyclic heat treatments, with and without sulfur (0.15 part per 100 system conventionally mixed and after 12 cyclic heat treated masterbatch leads to increases of modulus and tensile strength similar to those obtained with channel

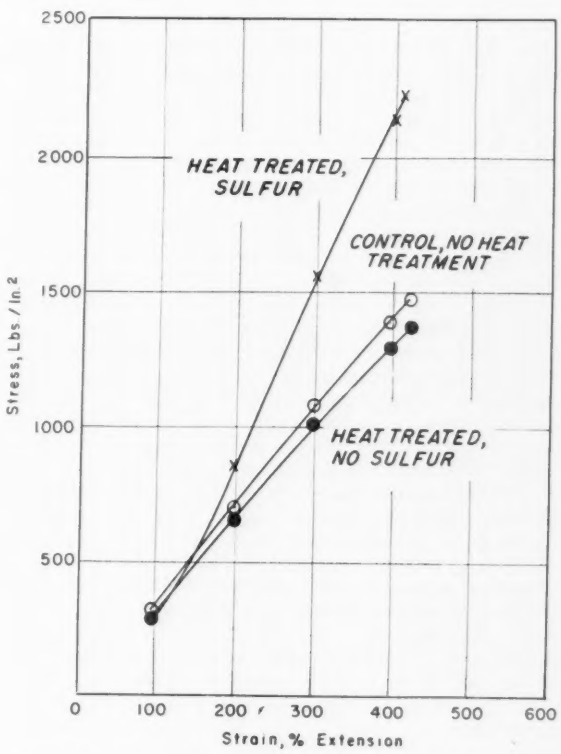


FIG. 1—Stress-strain properties of a Butyl-SRF compound heat treated with and without sulfur.

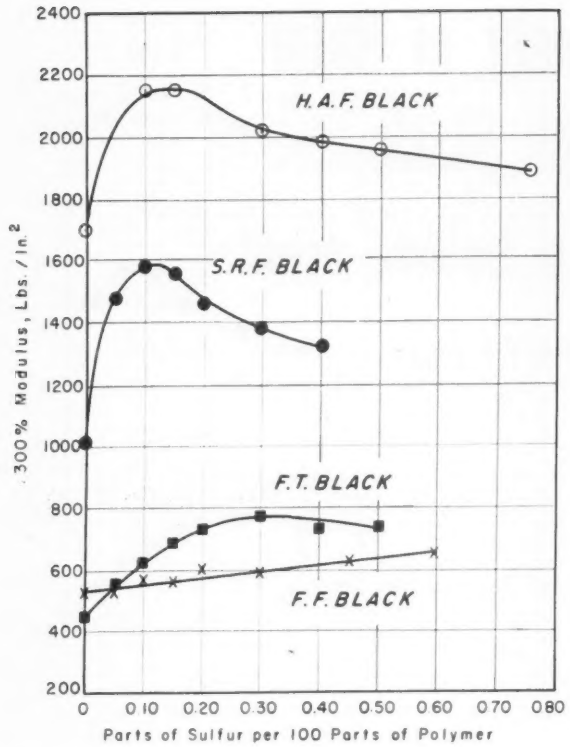


FIG. 2—Effect of sulfur concentration on the modulus of Butyl systems heat treated with four different blacks.

blacks. No loss in extensibility is produced in the former case and, for this reason, a greater increase in tensile strength is obtained. Resilience is also enhanced by sulfur heat treatment. Study of the damping behavior of the vulcanizates under conditions of free vibration (*3*) showed that the value of ηf was reduced from 2.42 to 1.43 (poises x c.p.s. x 10^{-6}) when sulfur was present in the treated masterbatch. The similar effects of sulfur and surface oxygen are thus demonstrated.

Effect of Sulfur Concentration With Four Different Blacks: The concentration of sulfur in the masterbatch is a critical factor in the heat treatment of Butyl mixtures containing non-channel blacks. The optimum concentration varies with the particular carbon black. Four masterbatches were prepared with HAF, SRF, FF, and FT blacks, respectively. Sulfur was added in varying concentrations to portions of each masterbatch and these were cyclically heat treated (12 times). A final portion was heat treated without sulfur.

The 300 per cent modulus of the resulting vulcanizates is plotted against the concentration of sulfur in Figure 2. Stress values at first increase with increasing sulfur to an extent depending on the black. The increase is very sharp with HAF and SRF blacks, and peak modulus is obtained with only 0.10 to 0.15 parts of sulfur. Systems prepared with FT black respond more slowly, the optimum modulus occurring at about 0.3 part of sulfur. In all these instances, maxima are found in the curves and the addition of more sulfur causes a regression in the stress values. The increase of modulus with sulfur content is quite slow in the FF black masterbatch. The increase is steady and yields no maximum in the range investigated.

Figure 3 shows a similar set of results for damping behavior. With a given black, the minimum value of ηf in this figure occurs at the same sulfur content as does the maximum value of modulus in Figure 2.

The decrease in vulcanizate properties at higher sulfur levels can be explained by the following observations: As the concentration of sulfur is carried beyond the optimum, evidence is found for polymer-polymer cross-linking. The masterbatches become tough and elastic during the early heats, as though partial cure were being obtained. On subsequent milling, hydrogen sulfide is evolved and the masses become progressively softer. The pattern of behavior grows more pronounced with increasing amounts of sulfur and persists through 4 to 6 cycles of heat treatment. It is believed to be a low order reclaim process, which leads to partial degradation of the polymer chains.

The improved physical properties resulting from heat treatment have been identified with modified or additional polymer-black linkages (*1, 2*). Since the latter are not obtained with furnace and thermal blacks unless a promoter is present, it must be assumed that they depend in some way on the reactivity of the promoter. Stearns and Johnson (*4*) have proposed that sulfur is an integral part of the bond formed between polymer and black during vulcanization and thus explain reinforcement. Whether this is so or not, the effects produced by sulfur indicate that some kind of reaction between the black and sulfur (or a chemical derivative of sulfur) is involved.

In normal vulcanization, the reactive sites on the polymer chains can be visualized as partaking in either (a) polymer-carbon bond formation, or (b) polymer-polymer cross-linking. The latter process restricts the

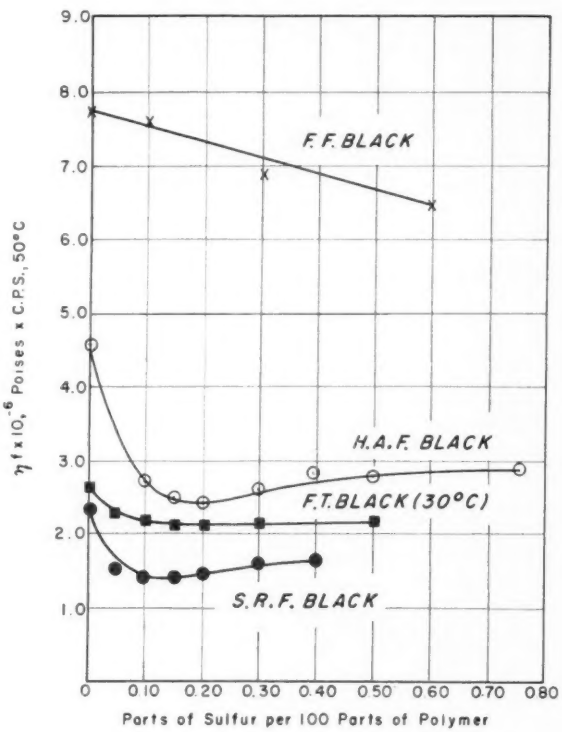


FIG. 3—Effect of sulfur concentration on the damping properties of Butyl systems heat treated with four different blacks.

former because the system becomes immobile. With low sulfur content, immobilization by process (b) is kept at a minimum, and process (a) is thus favored. More polymer-black attachments are made under these conditions and reinforcement is enhanced. This is exactly the same concept of heat treatment that was developed previously (*1*), except that, because of the difference in the nature of the black surface, sulfur is required to promote the action. The concentration of sulfur should be restricted within the region where carbon black-polymer reactivity predominates over polymer-polymer reactivity.

Effect of Carbon Black Concentration: As with the channel blacks, the magnitude of the changes resulting from heat treatment is proportional to the concentration of carbon black. Masterbatches were mixed with 20, 30, 40, 50, 60, 80, 100, and 120 parts of SRF black, respectively, per 100 parts of polymer, and 0.2 part of sulfur was used to promote thermal interaction. Half of each batch received no further treatment, and the other half was alternately heated and milled 4 times. The heating period was extended to one hour at 320°F. and was followed by the usual milling step. The increases in 200 per cent modulus resulting from the heat treatment are plotted (for the corresponding vulcanizates) against the carbon black concentration in Figure 4.

It was previously established (*1*) that the heat treatment effect is not due to alteration in cure rate. Carbon black-polymer linkages formed during the process account for the enhanced reinforcement. Figure 4 indicates that the formation of these linkages in the present vulcanizates is proportional to the carbon black concentration, up to about 80 parts of black. For each additional

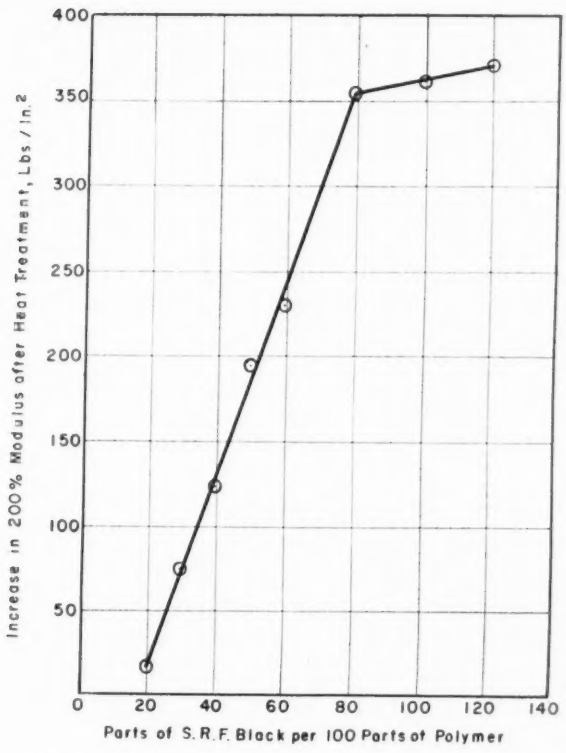


FIG. 4—Effect of carbon black concentration on changes in modulus resulting from heat treatment with sulfur (0.2 part per 100 parts of polymer).

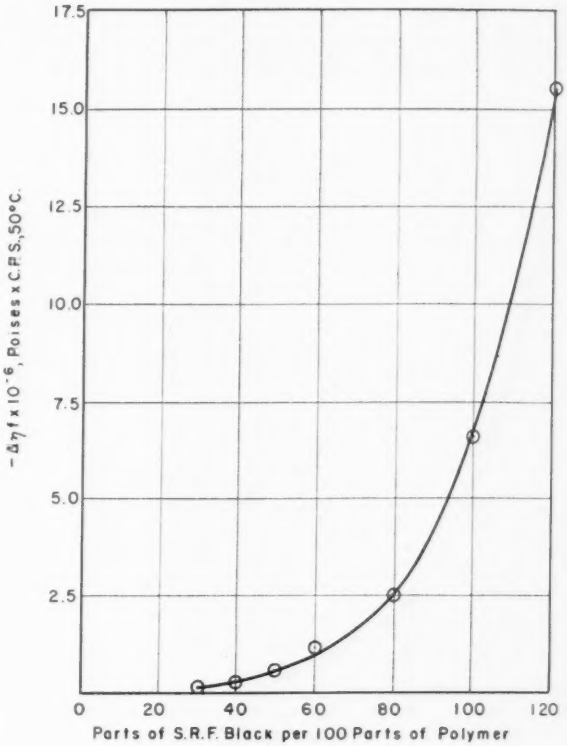


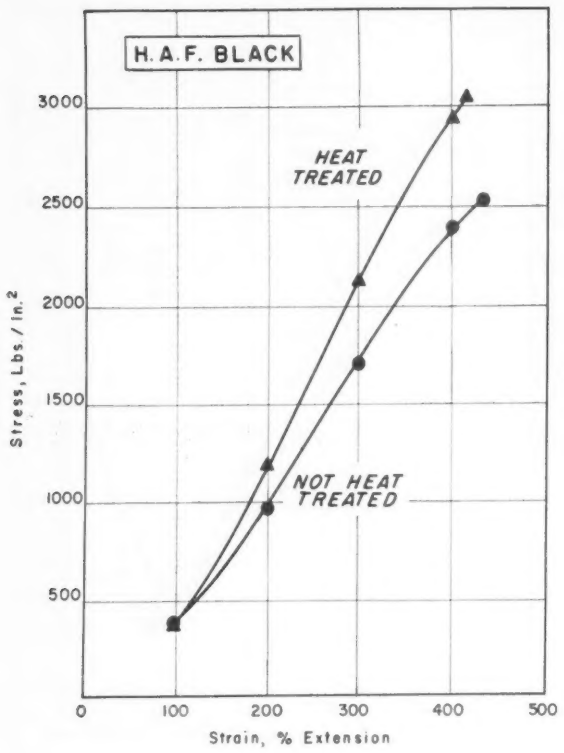
FIG. 5—Effect of carbon black concentration on changes in damping properties resulting from heat treatment with sulfur (0.2 part per 100 parts of polymer).

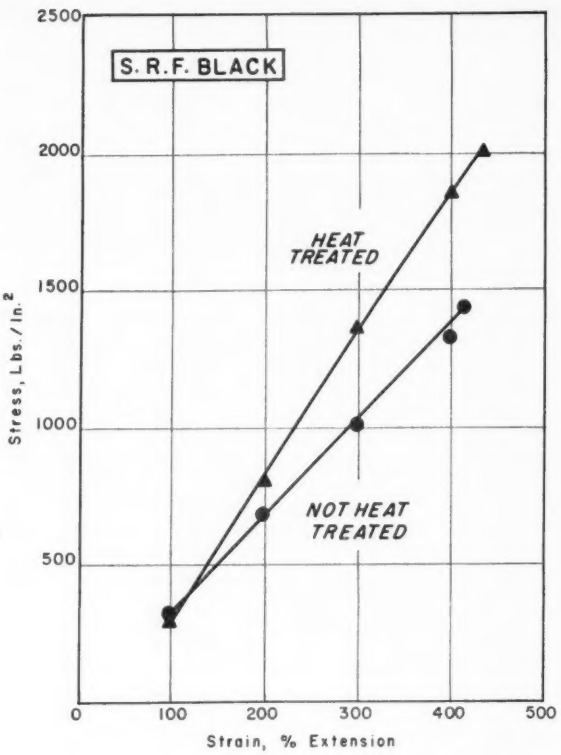
10 parts of black in this range, the change in modulus due to heat treatment is increased by 55 lbs. per sq. in. This value, on comparison with the corresponding increase (160 lbs. per sq. in.) found for a similar set of channel black compounds (*1*), demonstrates the lesser reactivity of the furnace black surface.

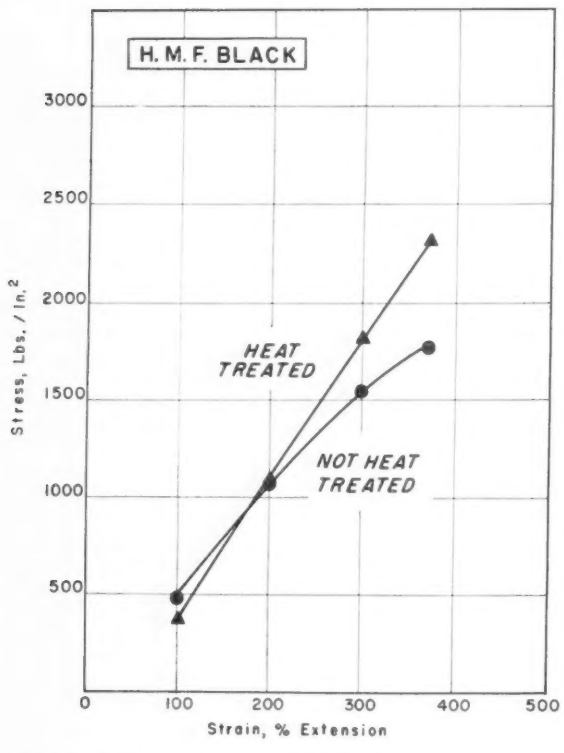
The discontinuity of the plot in Figure 4 is believed to result from an exhaustion of sulfur. No such reaction termination was found with channel black, nor would it be expected, because the latter carries its own promoting agent, so to speak, in the form of chemisorbed surface oxygen. The termination point in Figure 4, furthermore, would probably be shifted in the direction of increased black concentration if more sulfur were included in the system. This has not yet been experimentally tested.

The improvement in damping properties resulting from heat treatment is also enhanced in these vulcanizates as the quantity of carbon black is increased (Figure 5). Damping behavior, for some unexplainable reason, fails to show the sulfur exhaustion effect demonstrated in Figure 4.

Effect of Carbon Black Type: A series of masterbatches was prepared with a different sample of Butyl (GR-I-18), using 0.2 part of sulfur (per 100 parts of polymer) and HAF, HMF, SRF, CF (acetylene carbon), MT and FT blacks, respectively. Half of each batch was retained for the control and the other half was cyclically heat treated (12 times). Stress-strain properties, plotted for the resulting vulcanizates in Figures 6, 7, and 8, respectively, show the enhanced tensile strength and modulus properties produced in







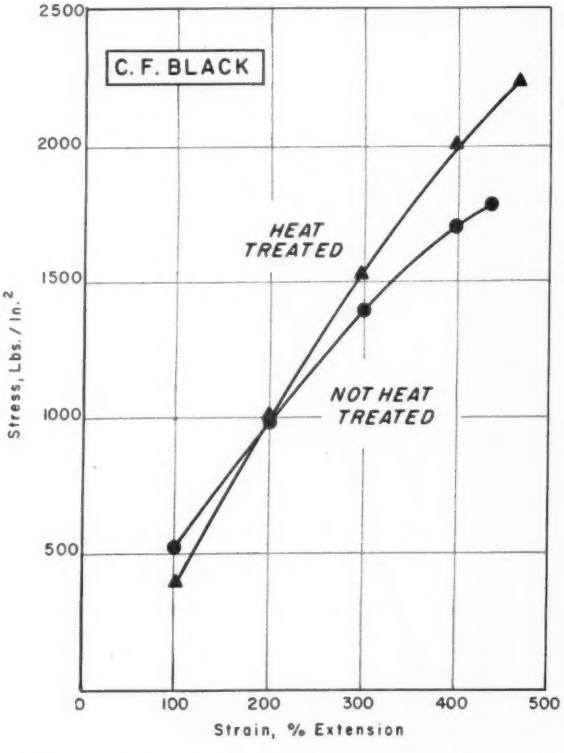
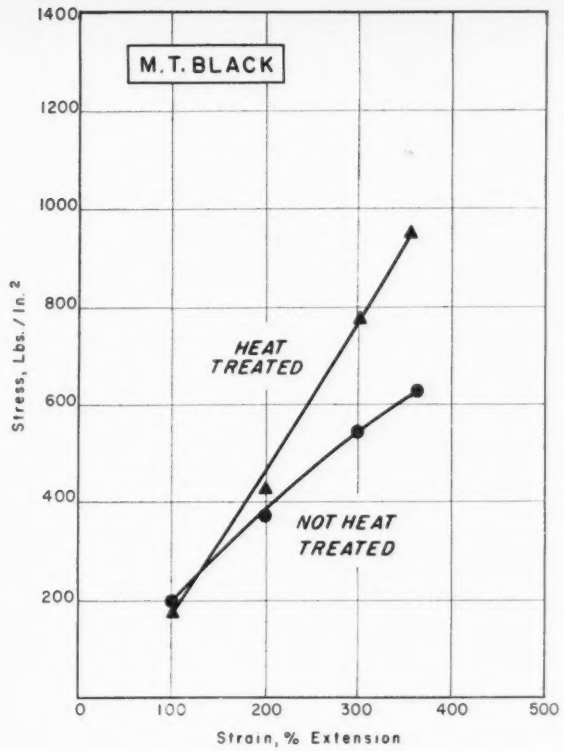


FIG. 6—Effect of heat treatment with sulfur on the stress-strain properties of Butyl with HAF and HMF blacks, respectively.

FIG. 7—Effect of heat treatment with sulfur on the stress-strain properties of Butyl with SRF and CF blacks, respectively.



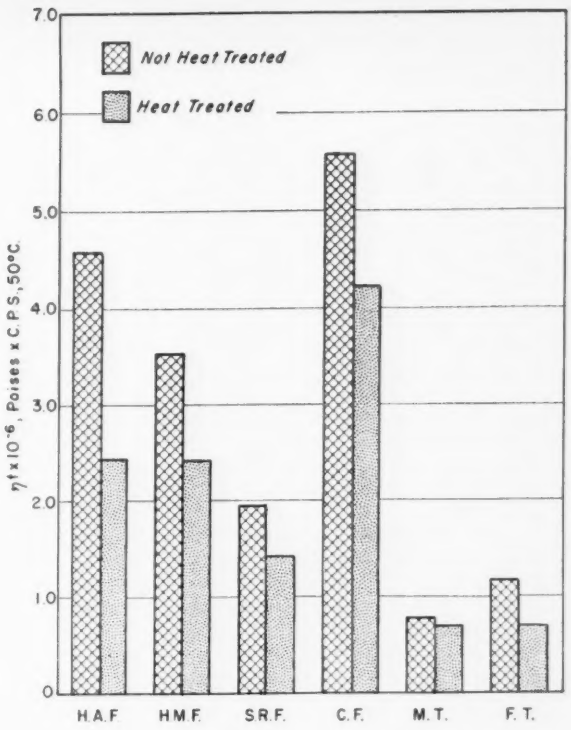


FIG. 9—Effect of heat treatment with sulfur on the damping properties of Butyl with several different blacks.

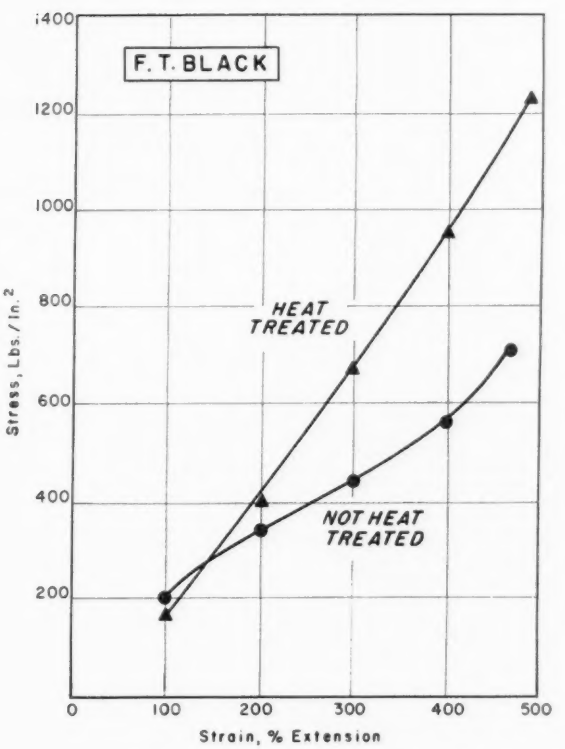


FIG. 8—Effect of heat treatment with sulfur on the stress-strain properties of Butyl with MT and FT blacks, respectively.

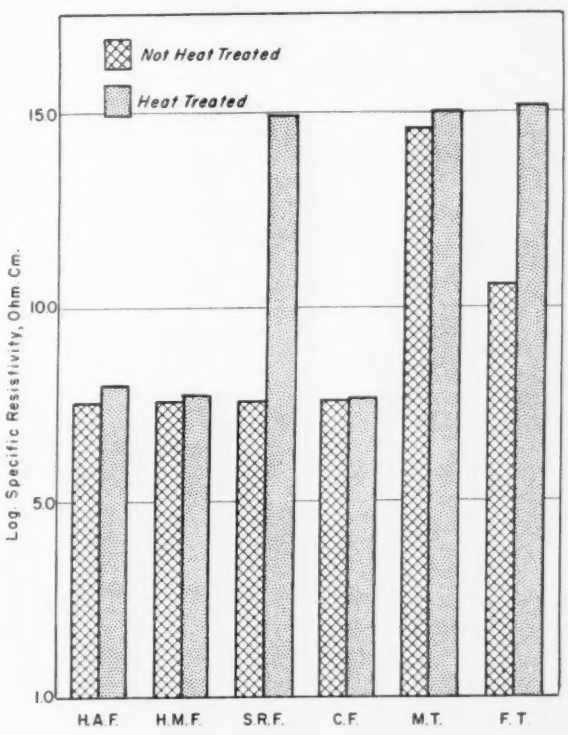


FIG. 10—Effect of heat treatment with sulfur on the electrical resistivity of Butyl with several different blacks.

these systems by heat treatment with sulfur. The results obtained with the thermal blacks are of particular interest, since the use of these blacks in Butyl leads to vulcanizates with the highest resilience. Heat treatment with sulfur also leads to improved damping properties, as shown by the ηf plots in Figure 9.

The original reticulate structure of carbon blacks suffers a widely differing fate when subject to severe milling conditions (*5*). MT, FT, and SRF blacks are among those whose structures are easily broken. Since disaggregation of original carbon clusters means better dispersion, it is not surprising to find that heat treatment of these systems leads to increased electrical resistivity (Figure 10).

HAF, HMF, and CF blacks are high structure blacks, and the words "fusion linkage" have been used (*5*) to describe both the appearance and persistence of carbon chains in these blacks even after strenuous mastication of their rubber mixtures. Figure 10 shows that the dispersion of these blacks in Butyl is not seriously altered by heat treatment with sulfur. Thermal interaction with all the blacks in this section has been confirmed by increased modulus and tensile strength and decreased damping behavior in the vulcanizates. In the light of the variable dispersion changes shown in Figure 10, this fact provides an independent argument for the view that reinforcement results primarily from association between polymer and black, and that dispersion, though it serves to promote additional numbers of these links, is a resulting effect.

Referring again to Figure 10, the dispersion change of the heat-treated MT black system may be greater than indicated, because the limit of the electrical resistivity measurements in the present work was of the order of 10^{15}.

Effect of Plasticizer: In contrast to the results with channel blacks (*1*), the heat treatment of Butyl containing non-channel blacks is not affected by the order in which plasticizer is added. The latter may be included in the masterbatch without detracting from the magnitude of the vulcanizate changes resulting from heat treatment. No explanation has been found for this difference in plasticizer effect in the sulfur non-channel and the channel black systems.

The heat treatment of Butyl with oxidized SRF black leads to increased modulus and tensile strength in the vulcanizate (*2*). In addition, the sensitivity of tensile strength to time of cure is minimized. The heat treatment with sulfur of a standard SRF black-Butyl system gives comparable results, as shown in Figure 11. Similar data have been obtained with HAF and HMF blacks. Thermal blacks respond somewhat differently to heat treatment with sulfur, in that the tensile strength of the vulcanizates retains its sensitivity to time of cure (Figure 12).

The addition of plasticizer to Butyl-thermal black systems heat treated with sulfur produces unusual results which are not obtained with furnace blacks. Tensile strength in the vulcanizates is increased, particularly at higher plasticizer concentrations, and the normal diluent effect of the plasticizer on breaking strength is thus reversed, even though the values of modulus are decreased in the usual manner. Figure 13 shows that the tensile strength of a conventionally mixed FT black compound is reduced at all cure levels by the addition of an acid-treated paraffinic distillate oil. Heat treatment of these systems with sulfur reverses the normal behavior. The enhanced tensile strength in the vulcanizates containing plasticizer is thought to result from the increased ability of the polymer molecules to orient when the system is extended.

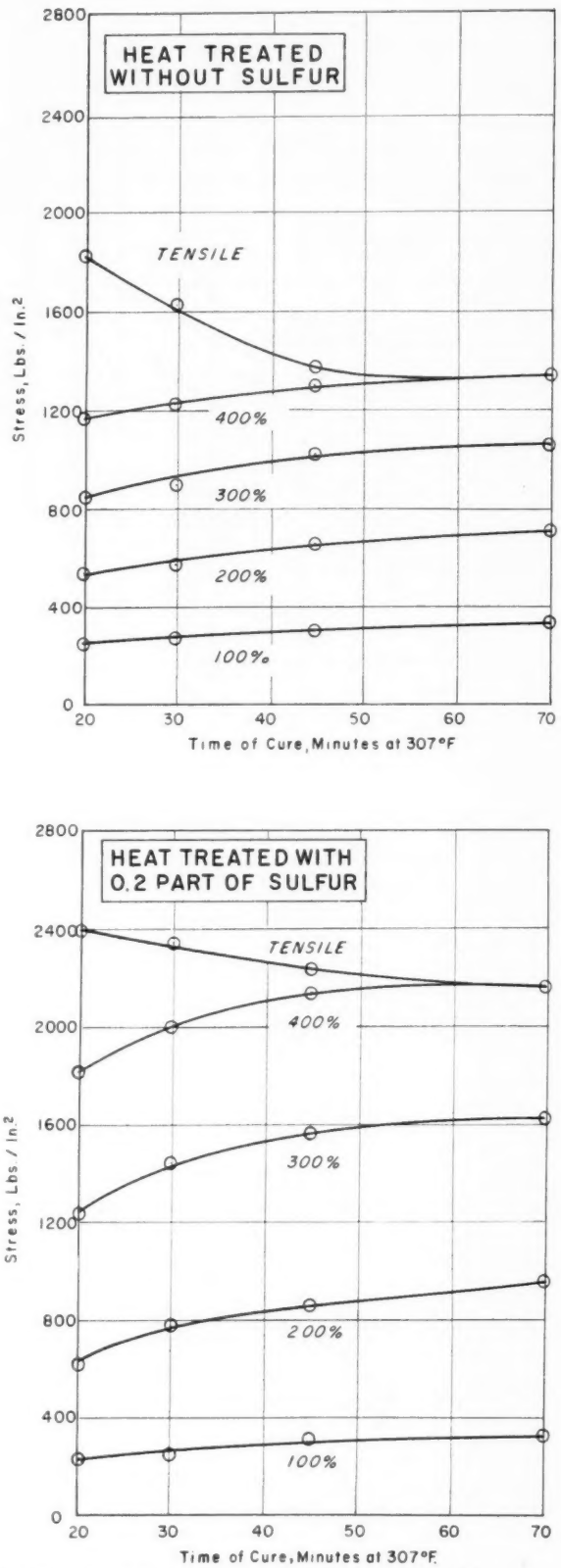
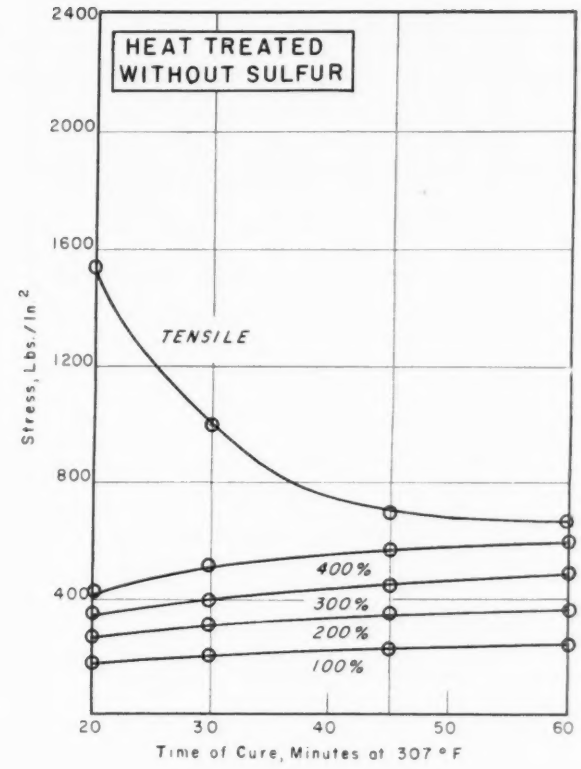
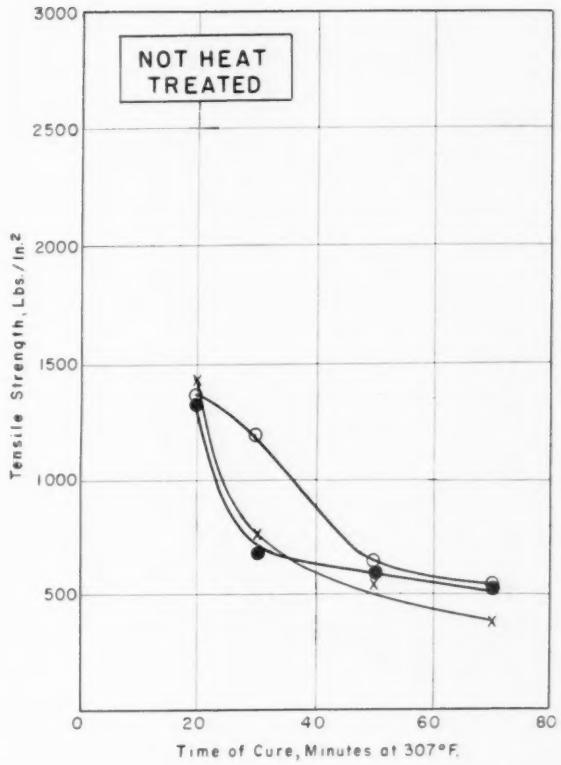
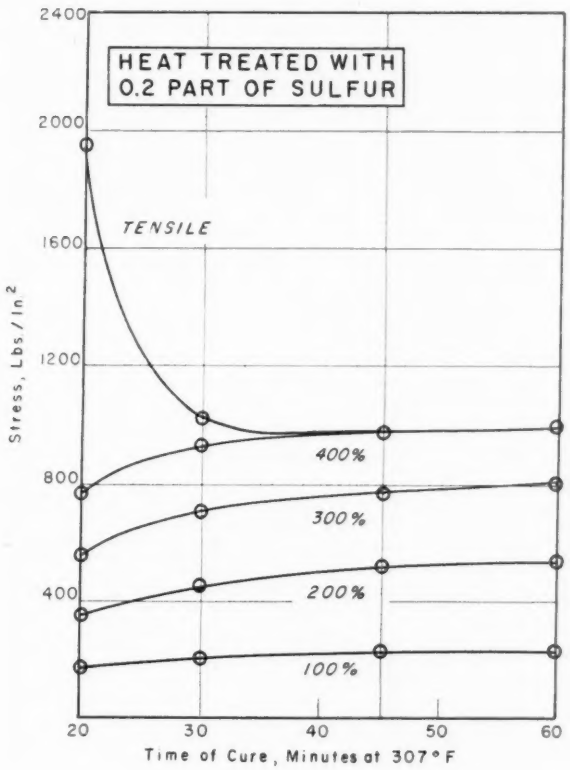


FIG. 11—Effect of heat treatment with sulfur on the vulcanizate properties of Butyl containing SRF black.







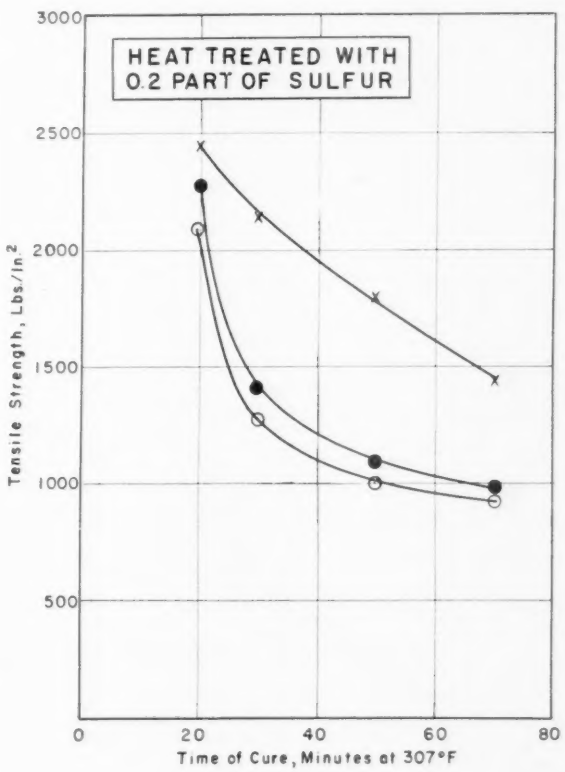
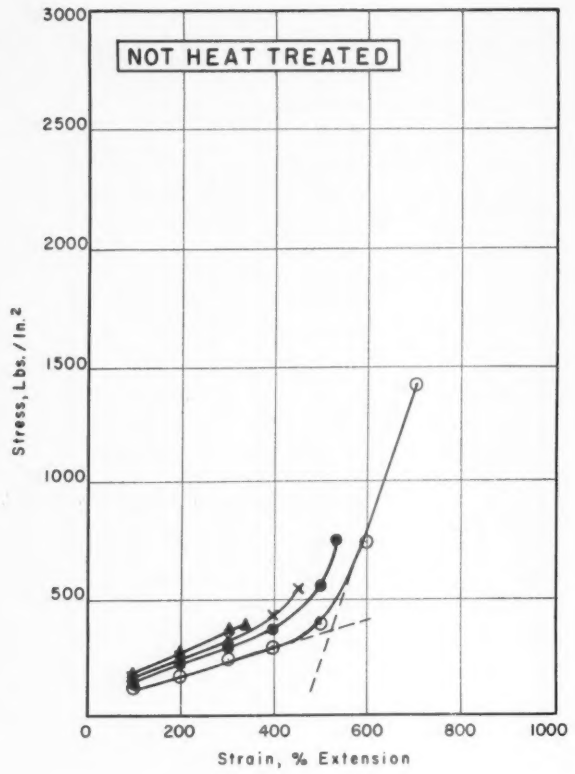


FIG. 12—Effect of heat treatment with sulfur on the vulcanizate properties of Butyl containing FT black.

FIG. 13—Effect of plasticizer on the tensile strength of Butyl-FT black systems with and without heat treatment.



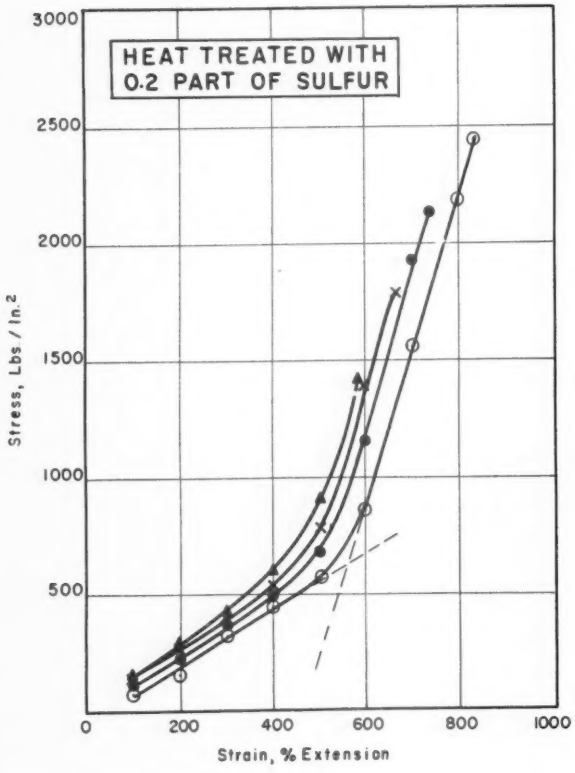
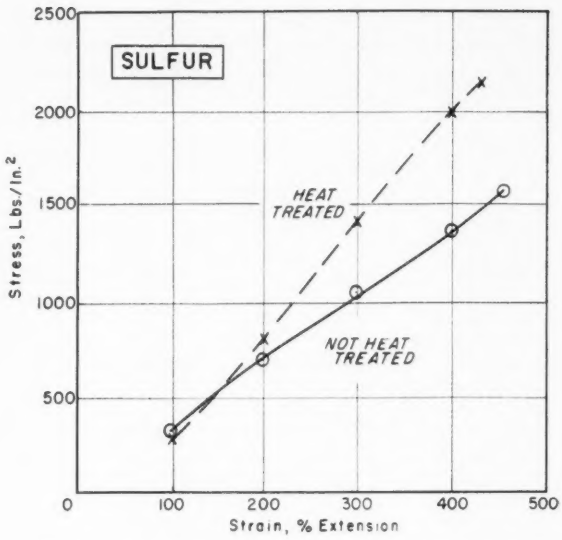
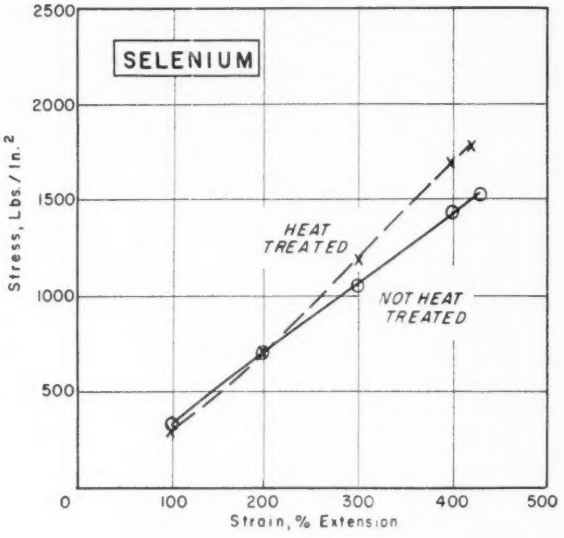


FIG. 14—Stress-strain properties of plasticized FT black systems before and after heat treatment with sulfur.





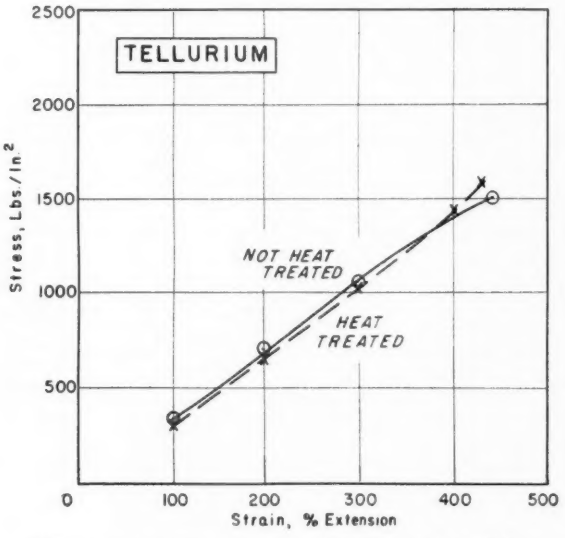


FIG. 15—Stress-strain properties of Butyl-SRF systems heat treated with sulfur, selenium, and tellurium, respectively.

Figure 14 shows stress-strain curves for a plasticized (15 parts of acid-treated paraffinic distillate oil per 100 parts of polymer) FT black system before and after heat treatment with sulfur. The curves for the heat-treated samples are formed in two regions. The rate of stress development, slow in the first region, is increased sharply in the second region, as the sample is extended beyond about 500 per cent. Both regions are linear and the curves might well be drawn as two straight lines. This behavior is not shown by the unheated samples (except at the lowest cure), because rupture occurs at extensions below 500 per cent. X-ray diffraction studies of these compounds, using optical density differences *(2)* as the basis for measurement, have shown that the onset of high order orientation coincides in each case with the initiation of the steep region of the stress-strain curve.

It thus appears that plasticization in heat-treated FT black systems permits the high extensions required for fiberization. Orientation in heat-treated SRF black vulcanizates occurs at lower extensions, and the normal diluent effect of plasticizer is observed. Further explanation for the different behavior of SRF and FT blacks in plasticized, heat-treated systems can not be given at this time.

Nitroso compounds and other promoters studied in this work give the same general effects as sulfur. Order of plasticizer addition is not an important factor in the heat treatment of non-channel black systems.

Heat Treatment With Selenium and Tellurium

The specific action of surface oxygen on the carbon *(2)* and of sulfur in the compound has been demonstrated. The scope of the reaction was broadened to include other elements appearing in the same group on the periodic table with oxygen and sulfur. Specifically, selenium and tellurium were considered in the hope that similar behavior could be demonstrated.

Conventional masterbatches were prepared with 50 parts of SRF black using 0.2 part of sulfur and 0.5 and 0.8 part of selenium and tellurium, respectively. The concentrations of the latter were taken on a molar basis with sulfur set at 0.2 part per 100 parts of polymer. Half of each masterbatch received no treatment and the other half was cyclically heated twelve times using the method already described *(1)*. Vulcanizing agents were added finally to each masterbatch and vulcanizates were cured for 45 minutes at 307°F.

Stress-strain data in Figure 15 show that the greatest improvement in physical properties results from heat treatment with sulfur. A much lesser effect is obtained with selenium, and very little, if any, effect is obtained with tellurium. Thus, the same trend of behavior is found for chemically similar agents with the extent of activity diminishing as the molecular weight of the promoting agent is increased. This suggests some kind of chemical process.

Results from the measurement of free vibration damping are in agreement with the stress-strain data in Figure 15. Values of ηf are given in Table II.

TABLE II—DAMPING PROPERTIES OF COMPOUNDS HEAT TREATED WITH SULFUR, SELENIUM AND TELLURIUM

Promoting Agent	$\eta f \times 10^{-6}$, Poises × C.P.S.		
	Sulfur	Selenium	Tellurium
Not Heat Treated.....	2.27	2.42	2.38
Heat Treated	1.61	2.05	2.25

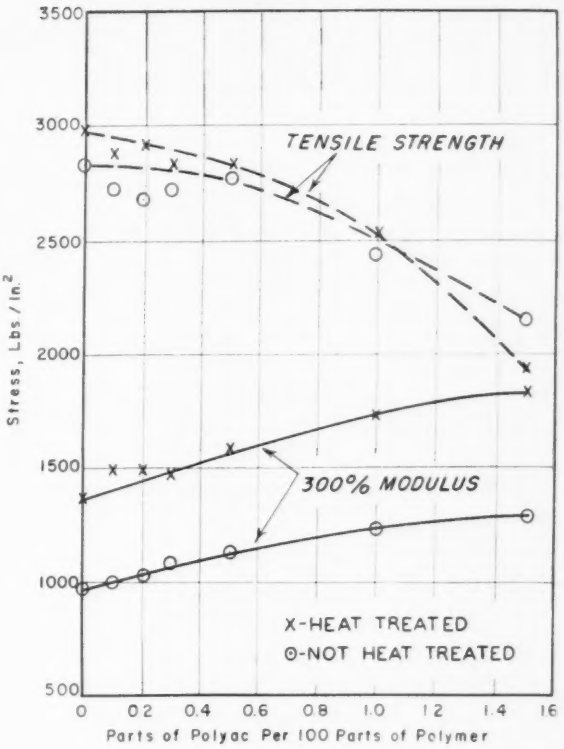


FIG. 16—Effect of Polyac concentration in masterbatch on the physical properties of an MPC black system before and after heat treatment.

The original reticulate structure of SRF black is largely dissipated by milling *(5)*. As Bulgin *(6)* has pointed out, carbon structure can be broken by external forces but the scattered structural units re-form in rubber during vulcanization. The authors have corroborated this work with Butyl-SRF systems *(7)*. If the black is milled in Butyl under rigorous mechanical conditions, the raw stock is found to have high electrical resistivity ($\sim 10^{14}$ ohm cm.). The corresponding vulcanizate, on the other hand, shows low electrical resistivity ($\sim 10^{7}$ ohm cm.). Heat treatment of Butyl with channel blacks or with other types of black and sulfur alters this behavior and high resistivity persists after vulcanization.

Disaggregated carbon, therefore, is immobilized by heat interaction and it is believed *(1)* that this is accomplished through polymer-carbon bonding. Selenium and tellurium would be expected to behave like surface oxygen or sulfur, and it was disappointing to find no appreciable increase in the electrical resistivity of the vulcanizates after thermal treatment with these agents.

Heat Treatment With Polyac (p-Dinitroso Benzene)

Effect of Polyac Concentration, With Channel Black: The promoting action of Polyac (30% p-dinitroso benzene and 70% inert filler) was demonstrated in the first paper of this series *(1)*. Dynamic heat treatment was applied to Butyl-channel black systems with and without Polyac and the superior vulcanizate properties in the former case were noted. p-Dinitroso benzene and other polynitroso compounds are active vulcanizing

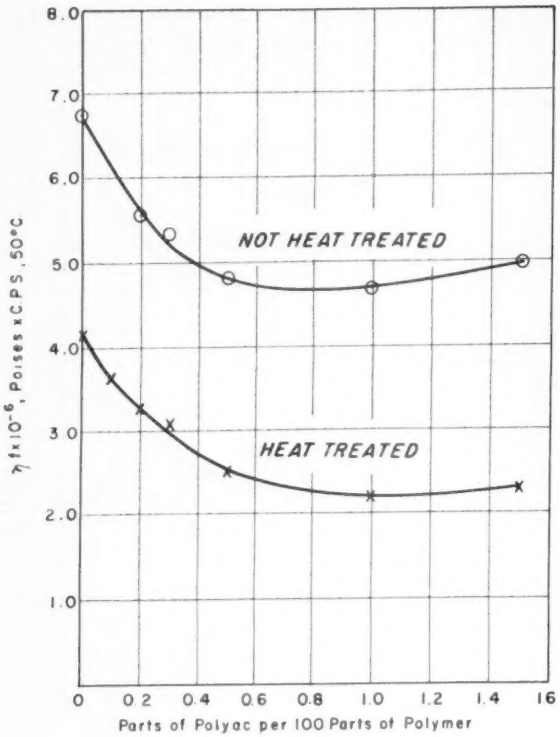


FIG. 17—Effect of Polyac concentration in masterbatch on the damping properties of an MPC black system before and after heat treatment.

agents for Butyl *(8)*. When these materials are included in normal sulfur cures, the vulcanizate obtains higher modulus and lower hysteresis properties as a result of this action. The effects are similar to those of heat treatment, but of a lesser magnitude. They are outwardly independent of the latter and may be added to it.

The vulcanizate changes which result from heat treatment accrue, as postulated before *(1)*, from the bonding of polymer and black. With channel black systems, the activity of surface oxygen on the black prevails in this reaction and the use of Polyac contributes little more than the purely vulcanizing effects just described. Figure 16 shows the effect of Polyac concentration on the physical properties of a channel black system with and without heat treatment. Modulus is increased in both sets of vulcanizates with increasing Polyac, and the near parallelism of the curves reveals that the nitroso compound does not greatly enlarge the change which results from unmodified heat treatment. It increases the absolute vulcanizate level, but it does this in both the normal and the heat-treated systems. The contribution of the Polyac reaction to heat treatment itself is perhaps better shown by the uppermost curve in Figure 19 where the change in modulus resulting from heat treatment is plotted against the concentration of Polyac.

The tensile strength of channel black vulcanizates (Figure 16) decreases sharply at higher concentrations of the nitroso compound and this imposes a limitation on the quantity of the latter which may profitably be used. Damping properties, like modulus, are improved by the addition of Polyac in systems with and without heat treatment, and the parallelism of the ηf curves in Figure 17 shows again that little advantage is gained in the heat treatment effect *per se* by modifying the channel black compound with a chemical promoter.

Masterbatches in this work were dynamically heat treated in a Banbury at 400°F. for 10 minutes. The temperature of each batch was taken with a calibrated needle pyrometer after 5 minutes and at the end of the run. The temperature ranges thus established were 400 to 410°F. and 430 to 440°F., respectively.

It is convenient, as in the section immediately above, to speak of the improved vulcanizate quality in channel black systems with Polyac as resulting from purely vulcanization effects, i.e., from polymer-polymer cross-linking. This, however, is probably not the whole story. There is evidence that Polyac also may promote the formation of polymer-black bonds. Some of these bonds, it is believed, are formed during the early stages of vulcanization. The number, based on the total potential, is very small when no Polyac is present.

Black particles, dispersed by milling, are not anchored and tend to flocculate *(9, 10, 11)* as the mass is heated in the early stages of vulcanization. This accounts for the drop in electrical resistivity which accompanies the normal sulfur curing of a well dispersed Butyl-carbon black compound *(1, 7)*. If Polyac is added in the compound, however, the electrical resistivity remains high after vulcanization *(12)*, and this fact is interpreted as meaning that black particles are anchored, presumably along the polymer chains, by the action of the nitroso compound. Masterbatches of Butyl with channel black were cyclically heat treated *(1)* without promoting agent and with sulfur (0.2 part per 100 parts of polymer) and Polyac (0.5 part per 100

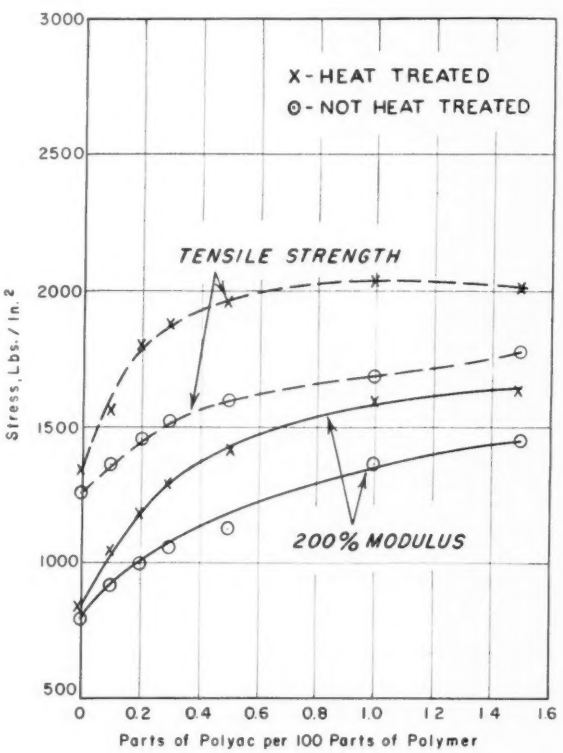


FIG. 18—Effect of Polyac concentration in masterbatch on the physical properties of an SRF black system before and after heat treatment.

TABLE III—ELECTRICAL RESISTIVITIES OF BUTYL-CHANNEL BLACK COMPOUNDS HEAT TREATED WITH AND WITHOUT PROMOTING AGENTS

Promoting Agent	Electrical Resistivity, Ohm Cm.		
No. of Cyclic Heat Treatments	None	Sulfur	Polyac
0	4.12×10^{7}	3.90×10^{7}	6.71×10^{10}
1	———	3.69×10^{7}	7.46×10^{14}
2	5.58×10^{7}	1.96×10^{9}	$>10^{15}$
3	———	3.41×10^{13}	$>10^{15}$
4	4.21×10^{8}	———	———
5	———	1.27×10^{14}	$>10^{15}$
6	9.32×10^{10}	———	———
8	3.22×10^{13}	$>10^{15}$	$>10^{15}$
10	1.46×10^{14}	———	———
12	3.22×10^{14}	$>10^{15}$	$>10^{15}$

parts of polymer), respectively. The electrical resistivities of the resulting vulcanizates are shown in Table III.

The initial high resistivity and the sharp rise of the latter on subsequent heat treatment demonstrate the particular reactivity of Polyac. If high resistivity is associated with the anchoring of black on the polymer chains, then it appears that some of these anchorages are made during vulcanization in the presence of the nitroso compound. Sulfur accelerates the rate of electrical resistivity increase also, but it is much less effective in this regard than Polyac.

Effect of Polyac Concentration, With Non-Channel Black: The work of the previous section was repeated

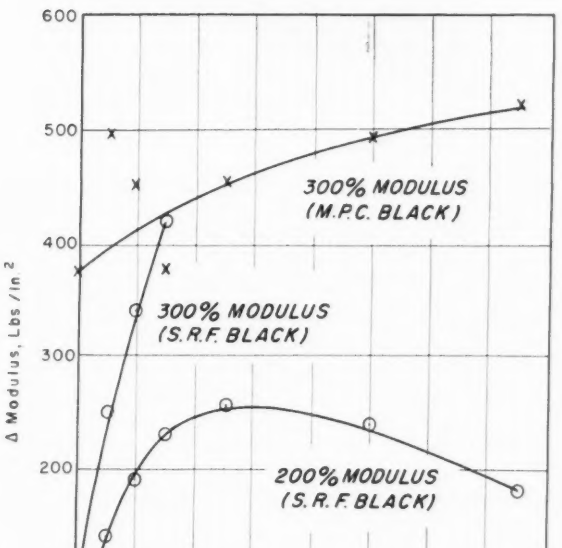


FIG. 19—Effect of Polyac concentration in masterbatch on the change in modulus resulting from heat treatment of Butyl systems with MPC and SRF blacks, respectively.

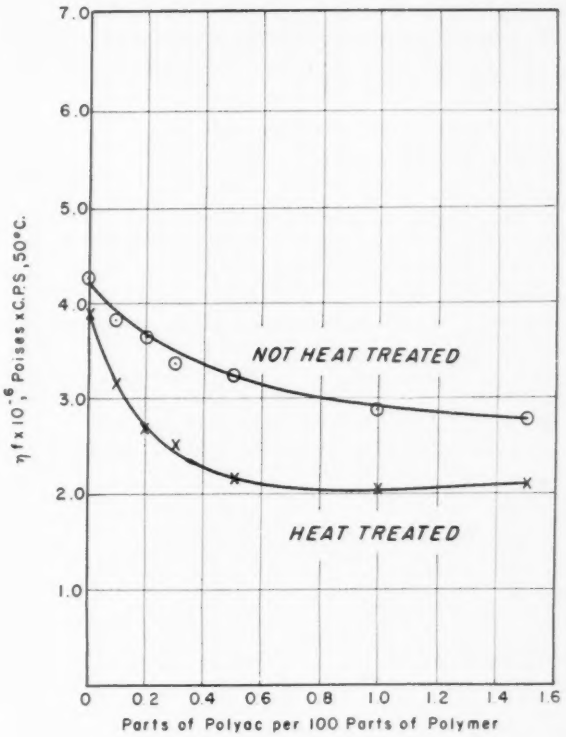


FIG. 20—Effect of Polyac concentration in masterbatch on the damping properties of an SRF black system before and after heat treatment.

in every detail using SRF black in place of MPC black. Figure 18 shows the effect of Polyac concentration in the masterbatch on the modulus and tensile properties of the resulting vulcanizates. At low concentrations of the nitroso compound, up to about 0.6 part, the curves are not parallel. The promoting action of the agent is thus demonstrated.

The change in modulus resulting from heat treatment of MPC and SRF systems is plotted against the concentration of Polyac in Figure 19. Comparison of these curves shows the basic difference in the heat reactivity of the two types of black. The effects of Polyac and heat treatment on the damping properties of the SRF black vulcanizates are shown in Figure 20. Elasticity, like modulus, is improved by the action of Polyac and heat treatment, up to concentrations of about 0.6 part per 100 parts of polymer.

Other Promoting Agents

The work in this paper has described results obtained with just a few of the promoting agents investigated. In the place of Polyac, other dinitroso, dioxime, and similarly related compounds having an ortho or para-quinoid aromatic nucleus or compounds which can be converted into such structure have been successfully used. Organic and inorganic sulfur compounds, such as benzothiazyl disulfide, tetramethyl thiuram disulfide, mercaptobenzothiazole, and phosphorus and antimony sulfides, have shown promoting actions similar to that of elemental sulfur.

(Continued on following page)

ACKNOWLEDGMENT

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Ross Three Roll Mills

New three roll mills introduced by Charles Ross & Son Co., 148 Classon Ave., Brooklyn 5, N. Y., feature a complete hydraulic adjustment of rolls for permanent accuracy. There are no intermediate wearable parts to affect gauge efficiency, and manual moving of rolls by adjusting screws is eliminated. The company states that the mills give greater production, and the settings on special pressure gauges can be recorded for perfectly reproducing the same material on repeat runs. The operator has merely to turn two handwheels until the required pressure reading shows on the gauges, and the rolls are automatically set in parallel adjustment for giving uniform dispersion across the entire face of the rolls. Uneven wear on rolls is thus prevented and maintenance costs thereby reduced. To set the mill to any required roll pressure reading, a very minimum of effort turns handwheels which activate the hydraulic roll adjustment. The gauges are an integral part of the hydraulic adjustment and there are no mechanical adjustments that can wear or result in loss of effectiveness of the gauges.

The mills feature a front adjustment which permits the operator to clean down the apron or to check the delivery roll for proper grind and take-off, while adjusting the handwheels and the gauges at the front of the mill. As handwheels are turned at the front, the back roll is moved hydraulically. The front roll is fixed, and the middle roll locates itself parallel between the front and back rolls. For cleaning the mill, the operator merely turns free-moving handwheels in the opposite direction until the gauges record zero pressure and the rolls are separated by special high compression springs.

For premixing when desired, between back and middle rolls, there is a quick acting device for disengaging the front roll. When premix is completed, the device is released and the middle roll adjusts to the front roll for finish grind and take-off. The mills are provided with an easily adjustable balanced apron to reduce excessive wear on the take-off knife. The apron is specially designed so constant pressure is maintained on the front roll as the knife wears. This assures continuous thorough take-off of material from the front roll, and, by preventing dispersed material from cycling back into the mill, gives uniform maximum production. The new mills are available in 4½ by 10-inch, 6 by 14-inch, 9 by 24-inch, 12 by 30-inch, 14 by 32-inch and 16 by 40-inch sizes.

The Keller BG-21, a new automatic **electric tracer controlled milling machine** patterned after the well-known Keller BG-22 but smaller in size and capacity, has been developed by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. Unlike machines using tracer attachments, the new unit has been specifically designed for electric tracer control.

Draftsmen, stenographers, typists and other factory and office personnel will find the **Sebrell 2X Magnifier Glass** of considerable help. Produced by the J. B. Sebrell Corp., 300 So. Los Angeles St., Los Angeles 13, Calif., this new magnifying unit is rectangular in shape and allows the user to see a complete line at a time. It is made from crystal clear plastic and is self-focusing.

Needle and globe valves made of unplasticized polyvinyl chloride are now available in quantity for use with **Boltaron pipe and fittings** in solving plant corrosion problems, according to H. N. Hartwell & Son, Inc., Boston, Mass. The valves are made of Boltaron 6200, which has shown outstanding chemical resistance to organic and inorganic acids, alkalis, and alcohols.

Editorials . . . . . .

Season's Greetings

ONCE AGAIN Christmas has come around and as always the spirit of the season stretches across the width and breadth of the land. Its strong, courageous touch comes as a kind of spiritual tonic, serving to renew our faith in all things worthwhile. It is most surely a season of friendship and we welcome the opportunity it brings to extend to all of our readers our sincere wishes for happiness, health and prosperity in the coming year.

THE PUBLISHERS

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Natural Limitations

THE ratio of natural rubber use to total new rubber consumption in the United States was approximately 45% in October, a gain of 6.5% from the low of 38.5% at the beginning of the year. This ratio was expected to show some increase in November and December and continue possibly into the early months of 1954. While the current quantitative consumption of natural rubber is somewhat less than in prior months by reason of lower industry activity, the ratio change is a direct indication that rubber products in general now contain more natural rubber. This is, of course, an encouraging sign for natural rubber producers.

Any discussion of the ratio of natural rubber to total consumption brings to the fore the question of supply. According to the latest Rubber Quality Bulletin issued by the Rubber Manufacturers Association, a review of forward estimates of total world rubber consumption through the year 1958 indicates adequate supplies of new rubber (natural and synthetic). These estimates indicate that if the American industry continues its use of natural rubber at the present level of approximately 45% of total, a moderate surplus of natural rubber production over consumption may continue through 1954. If, however, American industry increases its natural rubber use to 50% of total during the year, the estimated surplus would probably not develop.

The RMA bulletin further indicates that for the year 1955 and beyond, even if the highest natural rubber production estimate is used in the calculation, there will not be available enough natural rubber to maintain a 50% use in the United States. Based on the estimates involved, world natural rubber production and consumption could be balanced in 1955 by 47% use in this country, but for the years thereafter the ratio must decline to only 35% in 1958. (It should be evident that the estimates in question are based on a continually expanding consumption on the part of American rubber manufacturers). There should, however, be an ample supply of synthetic rubber to meet the expanding future requirements, making up for the inability of the natural rubber industry to expand its production.

As the RMA wisely adds, no one can safely predict the accuracy of the above estimates or any other estimates which assume no serious economic depression or active mobilization. A dozen other potential deterrents could easily be included in any list of "ifs." However, if these estimates do represent future events, the ratio of natural rubber use in the United States is limited and must eventually decline. The reaction of natural rubber producers to such a statement should prove most interesting.

Technical Research

UNLESS some drastic legislation is enacted quickly, the excess profits tax is slated to come off the books in 1954. Manufacturers in general will heave a sigh of relief when this is accomplished, but there are signs in the wind that the death of the tax will result in some changes in business policy. A recent survey of such thinking made by *Business Week* indicated that 53% of companies queried planned on cutting their entertainment expenses, 14% advertising expenses, 45% maintenance costs, 57% modernization and expansion, and 67% contributions.

The same survey indicated that 32% of the companies questioned planned on cutting technical reesarch activities, 55% planned no changes, and 13% planned active increases. While it is true that an 18c dollar is involved as against a 48c dollar, it seems poor policy to sacrifice a profit motive for a tax purpose, and most research insofar as industry is concerned is aimed at new and better products leading to greater profits. We are glad to report that a small sampling of the larger rubber companies indicates little change in research expenditures for 1954, with some increases anticipated.

NEWS OF THE MONTH

GOVERNMENT CUTS STOCKPILE RUBBER SALES; REVOKES SYNTHETIC CONSUMPTION DIRECTIVE

ON December 9, the government announced that it will sharply reduce its sales of natural rubber in an effort to bolster sagging natural rubber prices. Rotation of natural rubber in the national stockpile will now be cut to a monthly rate of 5,000 tons from the former rate of 10,000 tons, General Services Administrator Edmund F. Mansure said. The government has already contracted to sell at the 10,000 ton monthly rate through March, 1954. Therefore, the slowdown will not be felt before April. Earlier, on November 19, the Office of Defense Mobilization revoked the April, 1952 directive which required the resumption of rubber usage controls if the consumption of synthetic rubber fell below 510,000 tons annually. This action was also regarded as an aid to the Asian producers of natural rubber who have long regarded the directive "as a restrictive influence on the use of natural rubber in the United States." ODM pointed out that there has been no occasion to use the directive, because the industry has consumed more synthetic rubber voluntarily than the minimum set forth in the directive.

Under the new stockpiling program, consumers will have to look to the rubber market for an additional 5,000 tons of natural rubber a month. It has been estimated that they have been buying about 30,000 tons of natural rubber a month, getting 10,000 tons of that total from GSA and the balance from the market.

Another braking measure applied to the rotation program under the new plan is that forward sales will be limited to delivery in the immediate month following the month in which the sale is made. Outstanding contracts, some of which are for delivery as far ahead as next autumn, won't be affected. However, it is believed that beyond next March, GSA is not committed to deliver more than 5,000 tons a month.

Maintaining Quota Commitments

If existing selling commitments for delivery in April are below 5,000 tons, GSA will conclude new contracts in April to bring rotation sales in that month up to the 5,000 tons quota. The same will hold for subsequent months. The new procedure, Mr. Mansure stated, "is one of the steps in a complete study of the overall rotation program and of the grades and types of rubber which should be maintained in the stockpile."

By reducing stockpile sales, GSA went only part way in acceding to the revisions pressed by the State Department, rubber traders, and by such important figures as Representative Paul W. Shafer (Rep., Mich.), leading Congressional authority on rubber. In a letter to Defense Mobilization Director Arthur S. Fleming, Mr. Shafer wrote that he was "deeply concerned" over the "serious effects on our relations with rubber producing countries" of rubber stockpile practices. Mr. Shafer said that he had been told that stockpile rotation has had the effect of influencing natural rubber prices. The strategic materials stockpiling act "was not intended to influence or control commodity markets," he wrote Mr. Fleming. Mr. Shafer sent a copy of his letter to GSA Administrator Mansure.

A review of U. S. stockpile rotation policy was one of three recommendations made at the international rubber meeting held in London in October. A second recommendation was to abolish standby controls on synthetic rubber. This was done on November 19. A third proposal, to raise the price of GR-S, has been rejected.

The decision to revise stockpile sales policy was preceded by a meeting of GSA's Rubber Business Advisory Committee. It was reported that rubber traders at the meeting had urged that GSA stop upgrading the stockpile. They urged that lower grades rotated out of the stockpile be replaced with equal quantities of fresh supplies of lower grades.

Rubber manufacturers attending the meeting suggested a more moderate swing away from the all-out upgrading program. They recommended that 70 or 80% of the lower grades be replaced with higher grades.

The upgrading policy has been coming in for a great deal of criticism because lower grade rubber accounts for the bulk of demand in the United States. Indonesia and other countries which are heavy producers of lower grades charge that GSA's upgrading program has been particularly hard on them. On the other hand, Malaya, with its huge estate production of higher grade rubber, has found the stockpile rotation program a steady outlet.

The question of whether to continue upgrading, and to what degree, is likely to occupy the attention of GSA, the Department of State, and the office of Defense Mobilization for the next few months. The study Mr. Mansure promised will include a thorough check of the rubber stockpile inventory, including inspection of all grades and types to determine their condition—how rapidly they must be replaced in order to prevent deterioration.

Industry experts will take a major hand in this study, GSA said. It is likely that a subcommittee will be designated from the 18-man GSA Rubber Business Advisory Committee to pay special attention to this problem. There is also a chance that the advisors on this problem will be drawn from the Rubber Industry Advisory Committee to the Business and Defense Services Administration of the Commerce Department. The BDSA committee is expected to advise ODM.

Final Decision Up to ODM

The ultimate decision on further changes in the stockpile rotation program would probably be up to ODM Administrator Fleming, whose agency absorbed the Defense Department's Munitions Board. It was this latter agency which had instituted the stockpile upgrading program in a directive which was prompted by a desire to rid the stockpile of the heavy tonnages of off-grade rubber bought by GSA in the days when rubber was scarce following the outbreak of the Korean conflict.

The action on December 9 calling for a reduction in rotation will have no effect on GSA's role as a buyer in the natural rubber market. The agency will continue to buy small lots from time to time to help complete its scheduled stockpile goal.

As for the order revoking the mandatory consumption directive, ODM stated that it had existed only as a warning to the rubber industry that it would again be saddled with consumption controls if it failed to consume the minimum tonnages

which the government felt was necessary to keep the synthetic plants operating at a war-ready level.

The somewhat lower production floors spelled out by Congress in the Rubber Act, as amended last year, remain in effect, ODM noted. The Rubber Act requires that synthetic rubber production should not fall below 200,000 tons annually for GR-S and 22,000 tons for special purpose synthetics "because of security considerations."

"Except for this requirement," ODM stated, "the removal of the directive permits unrestricted competition between natural and synthetic rubber." This year, synthetic rubber is expected to account for about 60% of the 1,300,000 tons of new rubber used in this country, with natural rubber accounting for the balance.

Far Eastern Activities

American and European buyers' complaints that Malaya is exporting substandard quality rubber will be investigated at an international conference to be held in Singapore at an early date. The Rubber Trade Association of New York and the Rubber Manufacturers Association are organizing the conference with Malayan authorities and Singapore rubber organizations. The proposals for the talks have been approved by the Packing and Marketing Committee of the International Rubber Study Group.

Complaints listed for discussion by the Rubber Trade Association include bad packing, moisture in bales, mixture of grades in delivery when the contract calls for a specific grade, and improper wrapping. It is felt that the Singapore conference will result in a better standard of Malayan rubber.

The plight of operators in Malaya was described as "grave" by the Rubber Producers Council of the Malayan Federation in a message issued to a special subcommittee of the House Armed Services Committee which visited the area recently. The message stated that the small holders averaged a monthly income now of about $20. It is said that the small holders and their families, constituting 30% of the population of the Malayan Federation, lived in such poverty as to expose them to the temptation of going Communist.

Meanwhile, Hugh S. Cumming, Jr., United States ambassador to Indonesia, has denied speculative Indonesian press reports that the U. S. had threatened Indonesia if that country concluded a rubber pact with Communist China.

"If there was any question of threats, it was in the Indonesian press," Mr. Cumming said, referring to the crescendo of anti-American stories in the nationalist press in that country following the dispatch a few weeks ago of an Indonesian mission to Peiping to explore the possibility of trade with the Communist regime, including the sale of strategic rubber.

Mr. Cumming declared that: "It seems illogical to me that any country would violate a ruling of the United Nations—a ruling which the country itself had accepted as a loyal member."

In May, 1950, the United Nations General Assembly overwhelmingly passed an embargo on the shipment of war materials to Red China, including rubber. This embargo usually is construed in Indonesia as an American embargo.

Mr. Cumming pointed out the phraseology of the Battle Act, embodied in all United States aid programs, which says that the United States will grant no more aid to countries which violate United Nations decisions. Indonesia has received about $4,000,000 worth of technical aid from the United States. Mr. Cumming said the United States was prepared to furnish economic aid provided Indonesia desired it.

With 52% of her revenue derived from rubber imports, Indonesia has been desperately concerned in recent months as the price of rubber fell to pre-Korean war lows. Indonesians unofficially take the position that the Korean cease-fire in July relaxes the embargo on Communist China.

A curious highlight to the issue is that the United States today is Indonesia's biggest rubber customer and these sales would be jeopardized by any rubber deal with Red China. Another point generally glossed over, although raised by one Moslem party daily, is that the United States proposed a long-term rubber contract with Indonesia in the early days of the Korean war pegged at inflationary prices. Indonesia, however, gambled on still higher prices and a protracted war.

Mr. Cumming said that in raw material transactions one party always became unpopular. "If prices advance, then it is the seller and if prices are low on the world market then it is the buyer," he said. The problem was to achieve some sort of price stability for rubber and other widely fluctuating raw materials, he said.

Synthetic Rubber Activities

Synthetic rubber activities in the past period have been limited. On November 17, the Rubber Producing Facilities Disposal Commission, whose job it is to sell the synthetic rubber industry, started its "timetable" of disposal by placing formal advertisements for bids in newspapers and magazines all over the country. By next May 27, all bids must be in. Then, seven months later, by December 27, 1954, the commission must complete negotiations with bidders for sale of the facilities, with facilities not necessarily to go to the highest bidder. By January 31, 1955, the commission must have ready for Congress a "package" disposal plan, which can be rejected in whole or part by Congress within sixty days.

Other news came from the Reconstruction Finance Corporation which, on November 4, issued an amendment to its "General Sales and Distribution Circular for Government Synthetic Rubbers" dated September 30, 1953 and covering procedure and basis for the sale of certain dry GR-S. The amendment defines the "transmittal date" as the date of the postmark upon the envelope containing any inclosures. Such date will serve as evidence of the time that any inclosure was sent.

The amendment also provides that upon the issuance by RFC of shipping orders covering purchase orders or acceptance of forward orders, there shall exist a firm and binding purchase and sale agreement. The amount of the purchase price is dependent upon the transmittal date. Where credit is not established, the purchase price (including the uniform freight charge) must be forwarded by the purchaser to the distributing agent upon receipt by the purchaser of a copy of the shipping order.

Technical Rubber

According to word from Malaya, steady progress is being made with the technical classification of Malayan rubber. The output in all grades has increased from 22,000 to 31,500 tons per annum in the last six months. To cope with the large number of samples examined, a new testing station is currently being constructed by the Rubber Research Institute of Malaya, which should be operating before the end of this year. Over 80 of the 100 estates cooperating are now shipping classified rubber and new estates continue to enter the program. The bulk of the production is still RSS 1, although quantities of lower grades of smoked sheet, brown and pale crepes and air dried sheet are being classified.

Bradley Container Corp. Formed

Bradley Dewey, former president of the Dewey & Almy Chemical Co., has announced formation of the Bradley Container Corp., Maynard, Mass., of which he will be president. The company will manufacture and market plastic tubes and bottles made by a newly developed European process for which the company has exclusive U. S. and Canadian patent rights. The new company has leased from Maynard Industries, Inc., more than 150,000 square feet of floor space in one of the buildings of the Assabet Mills, formerly owned and operated by the American Woolen Company. The lease runs for ten years with an option to renew. Manufacturing operations are expected to commence upon the completion of certain improvements in the property and the installation of equipment. Mr. Dewey, who retired last year as president of Dewey & Almy, estimated that there would be over 100 people employed by the end of this coming January and that employment would build up to about 300 persons within a year.

Announces Expansion Program

A $250,000 expansion of plant and manufacturing facilities at Watson-Stillman Fittings Division of the H. K. Porter Co., Inc., at Roselle, N. J., was recently announced. The expansion program includes additional land, buildings and the installation of specially designed automatic machine tools for increased production of forged steel fittings. The new facilities, when completed, will greatly expand production and provide better service to customers.

OKONITE BROADENS THE SCOPE OF HIGH MANAGEMENT FUNCTIONS

Okonite Co. of Passaic, N. J., for 75 years a major producer of electrical wires and cables, has expanded its administrative and executive structure, creating the new post of chairman of the board and emphasizing the area of research and product development. The broadening of the scope of management functions, which has resulted in the installation of Albert F. Metz as chairman of the board and chief executive officer, R. Stuart Keefer as president, and Edward D. Youmans as vice-president in charge of research and development, has been brought about by a sharp growth in the volume of business accompanied by vastly more complex operations. All of these appointments involve present personnel. Mr. Metz was formerly president, Mr. Keefer was formerly vice-president in charge of sales, and Mr. Youmans had been vice-president in charge of manufacturing and research.

Charles M. Kirkland, formerly factory sales manager at the Passaic plant, has been elevated to vice-president in charge of sales, and David W. Nurse, previously resident manager of the Wilkes-Barre plant, has been promoted to vice-president in charge of manufacturing for the company's three factories.

The complete departmentalization of the research activities recognizes the important role product development has played in building the corporation to its present position in the electrical industry, and the essential part this phase is expected to play in maintaining and increasing the high-level of customer acceptance of its products. With Mr. Keefer assuming the responsibility of executing all operating functions, Mr. Metz will be enabled to spend a greater portion of his time in the determination of policy, long range planning and the formulation of broad goals.

Mr. Metz, a native of Boston and a graduate of New York University, joined Okonite as an accountant in 1919. Rising swiftly through the ranks, he was appointed comptroller in 1924, elected a director and treasurer in 1928, and vice-president in 1945. He became president of the company in 1949.

Mr. Keefer entered the wire business in 1922, joining the Hazard Manufacturing Co. When that company was reorganized as a division of Okonite in 1927, Mr. Keefer continued as assistant sales manager. In 1946, he was appointed sales manager of the entire company, and was transferred to the executive offices at Passaic. He was named vice-president in 1947, and elected a director the same year.

Mr. Youmans, a graduate of Brooklyn Polytechnic Institute, joined Okonite 40 years ago as a laboratory assistant. He was named technical manager in 1928, made vice-president and technical director in 1943, and vice-president in charge of manufacturing and research in 1951. He was elected a director in 1952. Throughout his career, Mr. Youmans has made notable contributions to the development of insulated wires and cables, particularly in adapting synthetic rubber-like materials to these products.

Metz Keefer Youmans Nurse Kirkland

Executives of the Okonite Co. involved in the expansion of the company's management structure.

Mr. Kirkland, a graduate of Harvard, started his business career with Okonite in 1934. Following two years in the chemical laboratory, Mr. Kirkland entered the sales department, and was appointed secretary of the company in 1939. In 1942, he enlisted in the Army Air Force as a private, and returned as a major in 1945. He re-entered the employ of Okonite, and in 1947 was made manager of the latex and small wire department. Subsequently, he was appointed sales manager, and was named factory sales manager in 1950.

Mr. Nurse, trained in mechanical engineering at the University of California, joined Okonite in 1942 as a sales representative in the San Francisco office, after several years in the electrical wholesaling field. In 1947, he was made manager of the Portland district office. Early in 1950, Mr. Nurse was transferred to the Wilkes-Barre plant as assistant sales manager. Later that year, he became factory sales manager. In 1953, he was made resident manager and placed in charge of both sales and manufacturing for this plant.

Plant Maintenance Show Planned

Fifty-seven experts, drawn from all industries, will address the Plant Maintenance & Engineering Conference, to be held in Chicago, Ill., concurrently with the Plant Maintenance & Engineering Show, January 25-28. The conference will take place at the Hotel Conrad Hilton and the show at the International Amphitheatre. The exposition this year will be the largest ever held in the field. Thousands of new products will be shown. The show is now among the five largest annual industrial shows held in the country. L. C. Morrow, consulting editor, "Factory Management & Maintenance," will be general chairman of the conference. Highlight of this year's conference will be a panel headed by 16 speakers at the close of the proceedings at which an effort will be made to answer all previously unanswered questions. In addition to three general sessions, which all may attend, the program will be divided into 11 sectional conferences and 20 round tables so that discussion groups may be smaller. Four of the sectional conferences and all 20 round tables will be repeated to permit visitors to choose alternate days for attendance. Advance registration cards for both show and conference may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Recent Mansfield Appointments

A realignment of the administrative staff involving the appointment of three administrative assistants, and the creation of a new research department, has been announced by the Mansfield Tire & Rubber Co., Mansfield, Ohio. William A. Moser has been appointed an assistant to the president. Named as assistants to the director in the Research and Development Division are Kenneth R. Garvick, assigned to the Compound Department, and Robert C. Hudson, who has been assigned to design and construction. R. M. Gage, formerly manager of compound development, has been named manager of research of the New Products Division, a new unit of the company. Paul L. Cairns has been appointed manager of design and construction, succeeding Mr. Hudson, and R. J. Civay has been named to succeed Mr. Cairns as group head of design and construction. P. A. Hannewald has become head of specifications while W. S. Black has been named group head of tube and air bag construction. Newcomers involved in the new administrative capacities are Mr. Moser, a veteran of 30 years in chemical engineering, and Mr. Garvick, who was associated with the Firestone Tire & Rubber Co. before joining Mansfield Tire.

Announces New Alcohol Plant

Shell Chemical Corp. has started operations at a new alcohol denaturing plant near Chicago, Ill. Company officials stated that the new plant will substantially reduce the time required by the company to service orders from middle western points. The plant is equipped to furnish the most generally used grades of specially denatured alcohols and proprietary solvents and to ship them to an area that includes most of Illinois, Indiana, Wisconsin and Michigan, and parts of Ohio and Minnesota. Incorporating the latest design features, the plant is an addition to the general storage and distribution facilities that the company has been using at Argo, Ill. The alcohol will be delivered to Argo for denaturing from the company's Houston plant by river barge. It was also announced that the company is expanding its denaturing plant at Sewaren, N. J., to give improved service to East Coast customers. The firm's third denaturing plant operates in conjunction with its alcohol production facilities at Houston, Texas.

LATEST AUTOMATION DEVICES SHOWN BY RICHARDSON SCALE

Some of the latest developments in the field of automation, covering proportioning, weighing, conveying and feeding devices, were recently shown and explained to a group of technical editors by the Richardson Scale Co. at its extensive plant in Clifton, N. J. The visit also included a conducted tour of the company's new laboratory which is dedicated to systematically inventing and improving materials handling equipment and which is applying research techniques to a field that has for many years appeared to lie beyond the scope of research.

Of special interest to the rubber field was the new system developed by the company for automatically proportioning equipment. A remote-control batching process, it makes no mistakes, is fast, extremely accurate, cuts labor costs, and permits quality control which is practically impossible with hand mixing operations. Heart of the system are specially-designed instruments that control the weighing operation. They consist of military-type synchromechanisms which are mounted on the indicating arm of the scale dial and turn on and shut off the flow of material to the weigh hopper according to settings made on the master panel. One of these systems has recently been installed at the plant of the Ohio Rubber Co. at Willoughby, Ohio, and another is scheduled for early installation at one of the plants of the Goodyear Tire & Rubber Co.

New Tare-Weighing System

Also displayed was a new and unique automatic tare-weighing system that does away with even the smallest overages and underages. In this system, a drum, can, cylinder or box is automatically tared and then filled with product until a selected weight is reached. The precise weight of product in the container is then recorded or printed for permanent record. The system is applicable to any liquid or solid product in any operation where good quality control is desirable and where savings of a few ounces or pounds mount to considerable sums over a period of time.

A new Y-shaped conveyor has been developed by the company which permits two men packing products in textile or multiwall bags to turn out what three or four men normally can. Called a Y-veyor, it consists of two 3-foot spiral conveyors, which form the arms of the "Y," and a specially-designed 7-foot, 3-inch V-belt sewing conveyor, which forms the leg of the "Y." A controlling mechanism at the receiving end of the sewing conveyor is the key feature of the design. It prevents filled open-mouth bags, passing from the spiral conveyors to the V-belt conveyor, from spilling, tipping or twisting.

Another new item of interest was a rotary feeder which successfully handles exceptionally sticky or flushy materials. The key design feature of this unit is a rubber pocket that increases and decreases in volume when charging and discharging. There are 36 such pockets, each one 5 inches in diameter. The pockets tend to suck in product with a minimum displacement of air and urge material out at discharge, thus making the machine simulate a positive displacement pump.

The new laboratory, built at a cost of $150,000, is currently investigating the flow of solid materials in chutes, bins and hoppers, and before long Richardson Scale hopes to evolve a general equation for the flow of solids in any bin of symmetrical shape. To date, research engineers at the laboratory have collected considerable information on the pressure exerted by different materials on the bin discharging opening, as well as data on the lateral and vertical pressures existing at different points within the material mass.

NILSEN AND GARDNER ELECTED VICE-PRESIDENTS BY HEWITT-ROBINS

R. A. Nilsen

E. B. Gardner

Hewitt-Robins Inc., Stamford, Conn., has announced the election of Robert A. Nilsen and Ellis B. Gardner as vice-presidents of the company. Now vice-president and general manager of the Restfoam Division of the company, Mr. Nilsen was graduated from the University of Michigan. On completion of his formal education he joined the Mishawaka, Ind., plant of the U. S. Rubber Co. After a short time as a production worker, he was made a supervisor, after which he advanced step-by-step to higher positions, finally becoming general superintendent of the plant. He joined Hewitt-Robins in 1946 and became manager of production in the company's newly-established Foam Rubber Division in Buffalo, N. Y. He was named general manager of the division in 1952, the position he held at the time of his most recent promotion.

Mr. Gardner, now vice-president and controller of the company, was graduated from Columbia University in 1940 with a B. A. degree. After service with the Army Air Force and five years with the General Electric Co. at Schenectady, N. Y., he joined the Restfoam Division in Buffalo in 1946 as a factory accountant. During this time he did post-graduate work in accounting at the University of Buffalo. He subsequently became chief factory accountant for both the Restfoam and Rubber Divisions. He was appointed assistant corporate controller in 1950 and corporate controller later in the same year. Mr. Gardner is a member of the Rubber Industry Advisory Committee and the Conveyor Equipment Manufacturers' Advisory Committee in Washington, D. C., and is an alternate member of the State Department's Rubber Advisory Panel. He is also a member of the Accounting Council of the Machinery and Allied Products Institute and a trustee of the Pension Trust of the Rubber Manufacturers Association.

Acquires New English Plant

Witco Chemical Co., Ltd., London, England, has acquired a modern manufacturing plant at Union Lane, Droitwich Spa., Worc., England, for the manufacture of latex compounds and auxiliary chemicals, adhesives, wax and rosin sizes and certain types of lubricants and emulsions.

Fisk Inter-Urban Snow Tire

A new mud and snow tire called the "Fisk Inter-Urban," giving up to 25% faster starts on packed-down snow and also giving greatly improved riding ease on open highways, has been announced by the Fisk Division of the U. S. Rubber Co. In this new passenger car tire, the extra-long tread fingers give exceptional starting power that helps motorists pull through slush and mire. Tread grooves are wide, and the flexible tread snaps mud or snow out of the tire with each revolution of the wheel, the firm states. Another feature of the Fisk Inter-Urban is its skid resistance on cleared roads, due in part to the exclusive, angled tread. This helps make the tire resist sideslip, spins, and skids. Despite the improved traction of this tire in mud or snow, cleared-road comfort has been increased by means of a smoother ride. Irritating buzz or hum has been materially reduced, while still maintaining good traction qualities in mud and snow. The Fisk Inter-Urban is also available with white sidewalls, for motorists who want to keep their cars "all white."

RHODE ISLAND GROUP HEARS TALKS BY RHINES AND SEARS

The November 19th meeting of the Rhode Island Rubber Club held at the Metacomet Golf Club in East Providence, R. I., featured two interesting addresses, one by Dr. Chester Rhines of the Research and Development Division of the U. S. Rubber Co., and the other by W. J. Sears, vice-president of the Rubber Manufacturers Association and chairman of its Crude Rubber Committee.

Dr. Rhines spoke on "Modern Plantation Methods in Production of Natural Rubber Latex." Several years of actual experience in the Far East lent the flavor of "on the spot" reporting to his remarks. Mr. Sears gave a "Progress Report on the Natural Rubber Quality Program of the Rubber Manufacturers Association."

In addition to a resume of natural rubber quality, Mr. Sears reviewed the international policy aspects of rubber. On improving the quality of natural rubber, the speaker stated that it is believed some improvement has been made during the past year. The seminar program, he said, demonstrated that the rubber chemist and the compounder, in addition to the buyer, could be a good policeman in assuring that his company received proper deliveries.

Mr. Sears said that RMA has established a working liaison with the Crude Rubber Committee of the American Society of Testing Materials with a member of that committee serving on the RMA Crude Rubber Committee. The relationship with the Rubber Trade Association of New York was further improved when that organization formed its own Crude Rubber Committee which meets jointly with the RMA committee for consideration of mutual problems.

The speaker stated that for the year 1955 and beyond, even if we use the highest natural rubber production estimates, it is indicated that there will not be enough natural rubber available to maintain a 50% use in the United States. Based on these estimates, world natural rubber production and consumption could be balanced in 1955 by 47% use in the United States.

For the years thereafter, the ratio must decline each year to only 35% in 1958. Mr. Sears said that he believes there will be an ample supply of synthetic rubber to meet expanding future requirements making up for the inability of the natural rubber industry to expand its production.

He noted that the 23c government selling price for GR-S has been attacked by the natural rubber industry as "noncommercial." They believe, he said, that under private ownership the price will of necessity be increased. There is some opinion in this country to support this conclusion; however, the great body of evidence indicates that it is probable that under private ownership the selling price of GR-S will not materially differ from the government selling price.

If it is assumed that the present 23c selling price of GR-S might be maintained, then the price of its chief competitor, natural rubber, must be related to it. Mr. Sears declared that it is his belief that there is an adequate supply of both natural and synthetic rubber to meet the future increasing demand, and therefore it is conceivable that the rubber manufacturing industry, for the first time in many years, can look forward to an assured supply at reasonably stable prices.

Coming Events in the Rubber Industry

Jan. 24, 1954. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Jan. 27-29, 1954. Society of Plastics Engineers, Inc., Tenth Annual National Technical Conference, Royal York Hotel, Toronto, Ont., Canada.

Jan. 29, 1954. Akron Rubber Group, Winter Meeting, Mayflower Hotel, Akron, Ohio.

Feb. 5, 1954. Chicago Rubber Group, Congress Hotel, Chicago, Ill.

Feb. 11, 1954. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Feb. 12, 1954. Connecticut Rubber Group, Bridgeport, Conn.

Feb. 12, 1954. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Mar. 26, 1954. Boston Rubber Group, Spring Meeting, Hotel Somerset, Boston, Mass.

Mar. 26, 1954. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Apr. 2, 1954. Akron Rubber Group, Spring Meeting, Mayflower Hotel, Akron, Ohio.

Apr. 8, 1954. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Apr. 9, 1954. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Apr. 14-16, 1954. Rubber Division, A.C.S., Spring Meeting, Hotel Brown, Louisville, Ky.

Apr. 30, 1954. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

May 14, 1954. Connecticut Rubber Group.

June 18, 1954. Akron Rubber Group, Summer Outing.

June 18, 1954. Boston Rubber Group, Summer Outing.

June 22-25, 1954. Institution of the Rubber Industry, Third Rubber Technology Conference, London, England.

June 25, 1954. Detroit Rubber & Plastics Group, Summer Outing.

Sept. 15-17, 1954. Rubber Division, A.C.S., Fall Meeting, Hotel Commodore, New York, N. Y.

Sept. 18, 1954. Connecticut Rubber Group.

Oct. 8, 1954. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Oct. 15, 1954. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Dec. 10, 1954. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 10, 1954. Detroit Rubber & Plastics Group, Sheraton Cadillac Hotel, Detroit, Mich.

Dunlop Tire Promotes Crawford

At a meeting of the board of directors of the Dunlop Tire and Rubber Corp., held on November 20, 1953, Glenn H. Crawford was elected executive vice-president and treasurer. Mr. Crawford joined the Dunlop organization in 1927 and since 1946 has served as vice-president and comptroller.

Quebec Group Hears le Beau

At the November 19th meeting at the Queen's Hotel in Montreal, Que., Canada, the Quebec Rubber and Plastics Group heard an address by Dr. Desiree le Beau, director of research for the Midwest Rubber Reclaiming Co. Dr. le Beau spoke on "Reclaim and Reclaiming Processes as Part of the Development of the Rubber Industry." The sources of natural, synthetic rubber and reclaim were discussed. The theoretical aspect of reclaiming was reviewed and most recent methods of production explained. The talk was followed by the presentation of an interesting color film on the reclaim process as it is carried out at Midwest Rubber.

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UNICELLULAR POLYETHYLENE ANNOUNCED BY BAKELITE CO.

A new cellular polyethylene with half the weight and a dielectric constant about one-half that of regular polyethylene has been developed by the Bakelite Co., a division of the Union Carbide and Carbon Corp. The new material has been extruded at Bakelite laboratories on various sizes of wire and has been used successfully to insulate ultra-high frequency television lead-in wires.

"Bakelite polyethylene, which is already the lightest of commercial plastics, has been expanded to about half of its original specific gravity in a new development of this versatile plastic," according to A. E. Maibauer, manager of the Wire and Cable Materials Division. "The new unicellular polyethylene is expanded with the aid of a blowing agent which produces a material constructed essentially of unconnected cells. With its lower specific gravity and reduced dielectric constant, the new cellular polyethylene is expected to prove especially useful in applications where weight savings in finished wire construction are necessary and where lower electrical attenuation and line losses are required, particularly at high frequencies.

"Besides an extremely low dielectric constant, excellent power factor and good dielectric strength, the new cellular polyethylene has a high resistance to water penetration," Mr. Maibauer stated. "Due to these remarkable properties, the new cellular polyethylene has made commercially feasible the insulation of antenna lead-in wires for new UHF and VHF television receivers. Economical application of the new expanded material solves an almost insurmountable insulation problem raised by ultra-high frequency television which could not be made commercially profitable with other insulating materials.

"The greater sensitivity of ultra-high frequency television signals to electrical field disturbances that produce noise and distortion in the television picture requires that insulation be built up to include the entire electrical field created between two paired lead-in wires. Moisture, dust and dirt settling on the thin strip of polyethylene that separates twin wires on low-frequency television lead-ins, provides a conductive path in the electrical field that causes disturbances at high frequencies. A solid insulating material thick enough to keep moisture and dirt out of the electrical field would be prohibitive in cost. Cellular polyethylene, however, accomplishes the purpose economically because of its expansion, which on a volume basis reduces the cost of the insulation. Also, none of the superior electrical characteristics of Bakelite polyethylene are sacrificed, but instead they are improved with the new material.

"Extrusion techniques for the new material have been developed satisfactorily in Bakelite Company laboratories," Mr. Maibauer pointed out. "During the extrusion process, the polyethylene compound is heated and the desirable cellular structure is obtained by the expansion of the gas formed. With the necessary pressure maintained in the extruder and die to prevent expansion of the gas, the new material expands to twice its usual volume immediately after leaving the die. The amount of expansion in the new cellular polyethylene may also be controlled to the exact degree desirable for the application involved.

"This new development opens up other commercial applications as yet unexplored, such as its use for flotation equipment. Cellular polyethylene floats in water much more readily due to its specific gravity of 0.47 as compared to 0.93 for standard polyethylene. The new Bakelite cellular polyethylene also retains to a large degree the exceptional chemical resistance of polyethylene which makes it impervious to corrosion by salt sea water, most acids, alkalies and oxidizing agents.

"The polyethylene compound recommended for applications where the use of cellular polyethylene is indicated, such as television lead-in wire, is supplied in commercial quantities by Bakelite Company. Varying degrees of expansion are produced by mixing the standard materials with Bakelite polyethylene in regular grades," according to Mr. Maibauer.

Cold Weather Coming

As the winter season approaches, it is suggested that latex consumers review their requirements for the next few months. All latices must be protected from freezing and all shipments are made at the buyers' risk. Usually, suppliers make tank car and tank truck shipments in insulated equipment, while carloads and truckloads of drums are handled in heated carriers. It is important, however, that all latex be removed from loading docks to heated quarters as soon as received. Common carriers are not liable for loss in connection with latex unless negligence or undue delay can be proven conclusively. If the latex should arrive in a solid or semi-solid state, it should be warmed gradually without agitation to a temperature of about 100° F. This is best done by means of storage in a heated room for 48 hours. Usually, this treatment will restore the latex to its normal state.

Nylon-Cotton Breaker Strip

New York Belting & Packing Co., Passaic, N. J., has announced that a new breaker strip now standard on heavy duty conveyor belts produced by the company, is being woven of nylon and cotton to give strength and impact resistance. The strength of nylon and the impact resistance and stretchability of cotton are combined in the new strip, which separates the belt carcass from the outer rubber cover. In weaving the strip, the two materials are tied together to give increased cushioning and shock resistance to the belts.

VERSATILITY OF RUBBER CEMENTS STRESSED BY GOODRICH EXECUTIVE

Rubber cements, undergoing recent startling changes by research, are now ranked among today's most versatile structural materials, according to Robert V. Yohe, vice-president-sales, of the B. F. Goodrich Industrial Products Division, Akron, Ohio. In a recent speech at Cleveland, Ohio, Mr. Yohe said that new synthetic rubbers, combined with resins into liquid structural adhesives, are the best means for bonding many of today's newly developed materials and alloys. The Goodrich executive cited the use of adhesives in the construction of military jet airplanes to provide skin sections and structural assemblies which withstand the terrific stress and vibration of supersonic speeds.

"Using bonded structural assemblies, new military aircraft are going into production with a semi-flexible construction. Such construction is unaffected by vibration and temperature extremes and possesses more strength with less weight than conventional riveted joints," Mr. Yohe said. He pointed out that a half-inch square bond of aluminum to aluminum will support more than a ton.

"It has been found that structural adhesives bond new metals and other materials without sacrificing such desirable qualities as improved weight, strength and heat resistance for which the new materials were originally developed. In contrast, welding becomes extremely difficult between dissimilar materials, solder has very little strength, while riveting and bolting creates localized stress areas," Mr. Yohe said.

Mr. Yohe predicted a promising future for structural adhesives in the construction industry. He said that porcelain panels, consisting of two porcelain sheets with a honeycomb structure bonded between them, have been used in curtain wall construction. With these panels, he said, buildings can be assembled and erected within a fraction of the time needed for conventional masonry buildings. The steel framework needed is much lighter than that required in conventional buildings and the building never needs painting or refinishing.

Describing organic solder, another new product in the structural adhesive field, Mr. Yohe said that the films of this solid material possess strengths of 10,000 pounds per square inch and can be manufactured with elongation characteristics up to 900%.

Liaison Committee Reappointed

John M. Ball (Midwest Rubber Reclaiming), vice-chairman of the Division of Rubber Chemistry of the American Chemical Society, has announced the reappointment of the previous Liaison Committee for 1954. The committee is composed of the following: R. E. Hutchinson (Firestone), Los Angeles and San Francisco; Daniel Reahard, Jr. (General Tire), Chicago and Fort Wayne; Stewart L. Brams (Dayton Chemical Products Laboratories), Southern Ohio, Detroit, Akron and Buffalo; J. S. Jorczak (Thiokol Chemical), Washington, Philadelphia and New York; and Lyle L. Longworth, Connecticut, Rhode Island and Boston.

COMMERCE DEPT. COMMITTEE REPORTS ON NBS ACTIVITIES

Secretary of Commerce Sinclair Weeks has made public the report of the Scientists' Committee for Evaluation of the present functions and operations of the National Bureau of Standards in relation to present national needs and their recommendations for the improvement and strengthening of the Bureau.

Secretary Weeks said: "I am in complete accord with the views of the Evaluation Committee of the high level of importance to the nation of the Bureau of Standards and of the need for strengthening the Bureau so that in its performance it measures up to this level. I shall do all in my power to aid in the strengthening of the Bureau so that it can fully discharge its responsibilities to the nation.

"The Committee's members," Secretary Weeks continued, "have rendered a valuable service to the nation," and their findings "will serve as a guide to the Department of Commerce and the National Bureau of Standards in their efforts to bring as rapidly as possible the Bureau to a state of maximum effectiveness."

Secretary Weeks said that he has already moved to carry out some of the Committee's recommendations as they crystallized during the progress of the study. The Committee lists its "more significant" recommendations for improving and strengthening the Bureau as follows: (1) Higher level of activity in the basic programs; (2) Modernization of facilities and increased space for basic programs; (3) Improvement of organization at the Associate Director level; (4) Transfer of weaponry projects to the Department of Defense.

Also, (5) Continued use of the Bureau by Department of Defense and Atomic Energy Commission for non-weaponry science and technical aid; (6) Continued and increased use of the Bureau by other agencies of Government in indicated areas of science and technology; (7) Decrease in repetitive tests operations at the Bureau; (8) Division of primary responsibility for policy and procedure on commercial product tests between the Secretary of Commerce and the Director of the Bureau; (9) Increased support of standard samples program; (10) Advisory groups to the Director selected from membership in eight scientific and technical societies.

The report also listed some major general conclusions reached by the Committee as follows: (1) The Bureau of Standards is of vital importance to national strength; (2) It is an organization with a splendid record and tradition, internationally recognized and respected; (3) It is, in general, staffed with professional men of competence, integrity and loyalty to the Bureau's functions and objectives.

Also, (4) With the increasing range and depth of technology, the need for the services of the Bureau of Standards becomes even more important and its functions more complex. The accurate determination of physical constants, the properties of materials, standards and standards practices and testing and evaluation procedures are all essential services for our industrial society.

Car Rentals Saving Time

According to the results of a 56-city study conducted by the Hertz Rent-A-Car System, almost 50% of the country's car rentals are made by traveling salesmen who use rented cars for business reasons. The report indicated that salesmen are using planes and trains increasingly to slash traveling time between cities and are renting autos at destination to see their customers. Eight years ago the large majority of rentals were made by in-town residents and were primarily for pleasure purposes, a Hertz official said. It is estimated that many salesmen increase their sales calls as much as 40% by abandoning chauffeur roles.

(5) Since the close of the war the technology of the nation has shot rapidly forward. The Bureau's basic programs expanded until 1950 but at a rate beneath that justified by the needs. Since 1950 the decrease in basic programs must be considered as tragic. The ground lost since 1950 should be regained in the next two fiscal years and the programs then expanded as detailed studies by the Director and his advisory committees find necessary.

Also, (6) Scientific and technical services to other agencies of Government are important responsibilities of the Bureau. In general, the Bureau has discharged these responsibilities well; (7) The Department of Defense and the Atomic Energy Commission have made broad and significant use of the Bureau. Their use of the Bureau in areas other than development of weapons is of value to the Bureau in its basic programs and should be encouraged.

Also, (8) The volume of weaponry development work has become large in comparison with all other activities of the Bureau. Its relative size and its effects on the other Bureau programs make its transfer from the Bureau desirable; (9) Other agencies of the Government do not make as large use of the services of the Bureau as might well be expected. The Committee believes that an increase in the use of the Bureau by other agencies of Government should be encouraged; (10) If the recommendations of the Committee are followed, the Bureau should be in a position to perform its authorized functions in balance at the minimum level for the nation's needs within a four-year period.

The Committee membership included the following: Dr. Mervin J. Kelly (Bell Telephone Laboratories); Dr. Lee A. DuBridge (California Institute of Technology); Dr. Kenneth S. Pitzer (University of California); Dr. William L. Everitt (University of Illinois); Dr. James W. Parker (Detroit Edison); Dr. Clyde E. Williams (Battelle Memorial Institute); Dr. Abel Wolman (Johns Hopkins University); Dr. Guy Suits (General Electric); and Dr. J. Barkley Rosser (Cornell University).

PLASTICS INDUSTRY ANNOUNCES VINYL FILM QUALITY PROGRAM

The new vinyl plastic film standard and seal of quality will be promoted through an educational program to retailers, fabricators and processors, according to a recent announcement by Bernard Mittman, chairman of the Vinyl Processors Administrative Committee of the Society of the Plastics Industry, Inc., and secretary-treasurer of the Elm Coated Fabrics Co. "Responsibility for carrying out this program is in the hands of a group of representatives of companies in the fields of retailing, vinyl film processing and vinyl film fabricating," Mr. Mittman stated.

"Since it is felt that the impetus of this program will be apparent by next Spring," continued Mr. Mittman, "it was decided to postpone the Fifth Film, Sheeting and Coated Fabrics Division Conference sponsored by the Society of the Plastics Industry, Inc., to March or April, 1954. At that time this educational program will be included as a prominent part of the two-day conference, which was originally scheduled for December 3 and 4, 1953."

Fourteen companies in the plastics industry have joined together to launch this vinyl plastic film educational program. It is anticipated that others may join this group as its plans unfold. The companies now in this program are as follows: Bakelite, Firestone Plastics, General Tire, Elm Coated Fabrics, Goodrich Chemical, Goodyear Tire, Harte & Co., Imperial Chemical & Plastics, Monsanto Chemical, Naugatuck Chemical, Presto Plastics Products, Respro, Inc., Ross and Roberts, and the Rubber Corporation of America.

Ralf Shockey and Associates, Inc., merchandising and sales promotion counsel of New York City, has been retained by the Society of the Plastics Industry, Inc., to handle this educational program. Joseph Broslaw is the account executive.

Buffalo Hears Studebaker

The October 6th meeting of the Buffalo Rubber Group held at the Westbrook Hotel in Buffalo, N. Y., attracted approximately 60 members and guests. The meeting was addressed by Merton E. Studebaker of the Phillips Chemical Co., who spoke on "Carbon Black." Mr. Studebaker's paper was divided into two parts. The first half summarized the knowledge of physicochemical properties of various kinds of carbon black. The last half dealt with certain aspects of carbon black-rubber mixtures and vulcanizates. An attempt was made to show how the fundamental properties of the carbon black affect the unvulcanized and the vulcanized stocks. A colloid chemical point of view was taken throughout the discussion. The after-dinner speaker was K. E. Smalley, vice-president in charge of mortgages at the M & T bank. He spoke on "Residential Mortgage Financing and Interest Rates."

Non-breakable jars made of Bakelite polyethylene are being manufactured by the Imco Container Corp. of Kansas City, Mo. They are produced in a wide range of colors and in capacities of 1, 2 and 4 ounces.

BAIRD RUBBER MARKS 50 YEARS' SERVICE TO RUBBER INDUSTRY

With 1953 drawing to a close, the Baird Rubber & Trading Co., Inc., of 233 Broadway, New York 7, N. Y., is preparing to embark on its second half-century of service to the rubber manufacturers of the Western Hemisphere. Over fifty years ago, William Torrey Baird and his brother, Robert Breckenridge Baird, formed the Rubber Trading Co., a name which was subsequently changed to the Baird Rubber & Trading Co., Inc.

William T. Baird had been with the Mechanical Rubber Co. and its predecessors for thirty years before resigning to form the importing firm with his brother. William T. Baird joined the rubber industry on September 2, 1873, as an office boy with the New York Belting & Packing Co. He advanced to the position of bookkeeper, and in 1885 was named cashier of the company. Some time later, he was elected secretary of the firm.

When the New York Belting & Packing Co. reorganized to become the New York Belting & Packing Co., Ltd., Mr. Baird was also elected secretary of this new company. This was in March, 1891. Later, on the formation of the Mechanical Rubber Co., he was appointed a director and on June 5, 1896, was elected treasurer of this company.

William T. Baird resigned from his position with the Mechanical Rubber Co. to form his own company, which he served as president until 1929. Until his death in 1941 he held the post of treasurer with Baird Rubber.

Robert Breckenridge Baird was born in Lock Haven, Penna., and at an early age came to New York where he found employment with Charles A. Cheever, president of the Okonite Co., as a bookkeeper. Later, he became connected with the New York & Boston Rubber Co., and was secretary of the company when it was liquidated. After some seven years in the real estate business, Robert B. Baird joined the New York Commercial Co., and began to visit rubber manufacturers in and about New York.

In July, 1896, he joined George A. Alden & Co. of Boston, Mass., serving the rubber trade in New England and Canada. He later represented Otto G. Mayer & Co. in crude rubber and Loewenthal & Morgenstern in reclaimed rubber. Robert Breckenridge Baird died in 1927, at which time he was chairman of the board of directors of the Baird Rubber & Trading.

W. T. Baird, Sr.

R. B. Baird

R. L. Baird

In 1907, Robert Lyle Baird, son of Robert B., joined the company upon his graduation from the Polytechnic Institute of Brooklyn. He became assistant secretary of the company in 1913, and was a vice-president at the time of his retirement in 1928. For many years, Robert Lyle Baird and Ralph de Palma, the famous auto racer, tested customers' tires at leading tracks throughout the United States. Robert Lyle Baird died in 1942.

Collier W. Baird, eldest son of William T., entered the business in 1910, following his graduation from the Sheffield Scientific School (which later became a part of Yale University). In 1913, he was elected assistant treasurer, and held the position of vice-president at the time of his retirement in 1945. Collier W. Baird made numerous trips abroad for the company, including a visit to Far Eastern estates.

Soon after his release from active service with the A. E. F. in World War I, William T. Baird, Jr., now president of Baird Rubber, joined the firm. The management of the company was placed in his hands in 1933, where it has remained to the present.

Collier W. Baird, Jr., joined the firm in the fall of 1947, after service with the Armed Forces in World War II. In January, 1948, he was elected assistant treasurer and a director, and in 1953 was named secretary of the company.

Robert B. Baird, II, grandson of one of the founders of the concern, became associated with Baird Rubber on March 1, 1948. Upon his release from military service in 1946, he joined the Acme-Hamilton Manufacturing Corp. of Trenton, N. J. At the time of his resignation from this corporation, he was acting secretary and assistant to the general manager of the Acme Rubber Manufacturing Co., a division of the parent firm. In December, 1948, he was appointed secretary and a director of Baird Rubber. In August, 1952, Robert B. Baird, II, was named a vice-president of the concern.

In addition to William T., Jr., Collier W., Jr., and Robert B., II, other executives of the firm are Denis P. Mochary, vice-president and a director, and Paul A. Mulach, sales executive. Mr. Mochary has been with the company for twenty years, while Mr. Mulach joined Baird Rubber last year. He was formerly vice-president and general manager of Institutional Services, Inc., Brooklyn, N. Y.

At the close of 1952, Harold W. Holcombe, well-known throughout the industry, retired from Baird Rubber after eighteen years' service. He had been in the crude rubber business for over 40 years, and had worked in several rubber factories before that.

Baird Rubber has always had its executive personnel see things "first hand," no matter how much travel it entails. The company's connections abroad are thus kept on a personal basis, and its executives obtain up-to-date knowledge of conditions in the natural rubber producing areas of the world. Both founders of the company were frequent visitors abroad, William T., Sr., having made a trip around the world at the age of seventy-six.

Through the history of the company, officers and executives have either had a background in rubber manufacturing, or have taken specialized university courses to familiarize themselves with the needs of manufacturers.

Today, the individual members of the firm belong to various rubber groups and technical societies. The company itself is a member of the Rubber Trade Association of New York, the Commodity Exchange, Inc., and the New York Commodity Exchange, and the Rubber Clearing Association, Inc.

W. T. Baird, Jr.

C. W. Baird, Sr.

R. B. Baird, II

C. W. Baird, Jr.

UBS Appoints Chemical Coatings

Union Bay State Chemical Co., Inc., of Cambridge, Mass., has appointed the Chemical Coatings & Engineering Co. of Darby, Penna., as sales and engineering representatives to analyze the anti-corrosion problems common to many industries and to custom service the application of proper coatings.

Rubarite Plant Opened

The formal dedication of the new plant of Rubarite, Inc., at Malvern, Ark., took place on November 20, with a number of federal, state and local government dignitaries participating. The new plant, believed to be the only one of its kind, will produce a synthetic rubber powder which is used in rubberized asphalt for road paving and other allied purposes. Rubarite, Inc., located six miles from Malvern, is owned jointly by the Goodyear Tire & Rubber Co., the National Lead Co. and Bird & Son, Inc. Nearly 100 persons were on hand to tour the new plant and watch a 30-ton dynamite blast touched off in Magnet Cove to obtain barytes needed in the manufacturing process.

During the past few years, Rubarite, the name given to the special compound, has been used successfully on a number of heavily traveled test roads. Engineers have concluded from these tests that Rubarite asphalt withstands changing weather conditions more ruggedly than conventional paving materials. Tests further indicate the new paving material will wear longer under the constant pounding of today's traffic. Rubarite is made by co-precipitation of synthetic rubber latex and extremely small particles of barytes. Other Rubarite installations which are proving satisfactory are located in Wisconsin, Kansas City, Mo., and Chicago, Ill.

Plans Black Production in U.K.

Arrangements have been made for the manufacture, in the United Kingdom, of Kosmos and Dixie grade of furnace carbon black previously produced only in the United States by the United Carbon Co. of Charleston, West Va. A long-term agreement has been reached whereby the United Carbon Co. is making its technical knowledge and engineering experience available to United Carbon Black, Ltd., Swansea, for the purpose of establishing standards and insuring control of quality. As a result of studies made by United Carbon at Swansea and in the Engineering Department in the United States, modifications of existing plant and processes are already in progress and plans have been made for the construction of additional capacity at Swansea. The modifications will result in the production of a general purpose furnace black to be marketed as Dixie 45 and Kosmos 45 by the selling agents of the United Carbon Co., namely, the Anchor Chemical Co. and Chance and Hunt. It is also planned to produce other types of carbon black at Swansea, similar to grades produced by United Carbon in the U. S.

New Western Electric President

Directors of the Western Electric Co., manufacturing and supply unit of the Bell Telephone System, have elected Frederick R. Kappel as president, it was announced recently. Mr. Kappel, a vice-president of the American Telephone and Telegraph Co., succeeds Stanley Bracken, who has been named chairman of the board. Mr. Kappel joined the Bell System as a ground man in 1924.

Warner Named Vice-President

Harry B. Warner

Harry B. Warner, formerly plant manager of the Experimental Station of the B. F. Goodrich Chemical Co. at Avon Lake, Ohio, has been named vice-president, technical, of the company succeeding Dr. Frank K. Schoenfeld, who was recently named vice-president in charge of research for the B. F. Goodrich Co. In his new capacity, Mr. Warner will direct the company's technical and development activities from the Cleveland, Ohio, office. Currently attending the 13-week advanced management course at the School of Business Administration of Harvard University, Mr. Warner will assume his new duties on January 1, 1954. Mr. Warner joined the B. F. Goodrich Co. in Akron in 1939 as a chemist after being graduated from Ohio State University with a B. S. degree in chemical engineering and an M. S. in chemistry. In 1942, he was made plant manager of the Niagara Falls, N. Y., plant of Goodrich Chemical, and in 1948, after several special overseas assignments, he was named assistant to the vice-president in charge of manufacturing. Later in the same year he became plant manager of the Avon Lake Experimental Station. Mr. Warner is a member of the American Chemical Society and the American Institute of Chemical Engineers.

LABOR NOTES

Seiberling Rubber Co. and Local 18 of the URW have signed a supplemental agreement as a forerunner to the signing of a new contract running to April 1, 1955. A 2½c an hour wage agreement was involved, retroactive to August 31, 1953. Meanwhile, wage and welfare negotiations are still going on between the union and three other concerns, American Hard Rubber, RCA Rubber and Eclat Rubber.

By a more than 2 to 1 margin, employees at Rempel Manufacturing, Inc., Akron, Ohio, voted for "no union" and against the URW in a recent NLRB election. The vote, NLRB reported, was 146 for the union and 376 against. The company has not had a union contract in the past.

Plans New Research Center

U. S. Rubber Co. has announced that it has acquired options to purchase a 90-acre tract of land in Preakness, Wayne Township, N. J., on which it plans to construct a new research center devoted to scientific research and development in the fields of rubber, chemicals, textiles and plastics. The research center calls for the construction of three new, modern laboratory buildings and service buildings at an approximate cost of four million dollars. The company's present research and development activities, now conducted in its general laboratories in Passaic, N. J., will be transferred to the new location. The arrangement and architecture of the buildings will suggest a university campus in appearance. The whole area will be naturally landscaped by the many tall trees now growing on the property. The company has found that university atmosphere is conducive to the best research and development work. A main laboratory with 90,500 square feet of floor area will be the largest building on the site. Other buildings are an experimental laboratory of 35,000 square feet of floor area, a chemical engineering laboratory with 8,500 square feet, a garage and a power plant to supply steam for the buildings. The research center will employ nearly 400 people.

NSC Rubber Section Heads

At a recent meeting of the National Safety Council in Chicago, Ill., R. W. Fickes (Goodyear) was elected general chairman of the Executive Committee of the Rubber Section. T. J. Cain, Jr. (Goodrich) was elected vice-chairman of the Executive Committee in charge of program. W. M. Graff (U. S. Rubber) was named secretary, while J. L. Dean was elected editor of the "News Letter." Other committees and their chairmen, are: *Engineering*, A. R. Pomeroy (Ohio Rubber); *Trade Association and Liaison*, J. J. Raytkwich (U. S. Rubber); *Health*, R. H. Wilson (Goodrich); *Membership*, R. W. Sands (U. S. Rubber); *Publicity*, W. J. Dooling (Hood Rubber); *Rules and Regulations*, G. D. Cross (Firestone); *Poster*, C. S. Kruger (Carlisle Tire); *Statistics*, S. A. Wright (Inland Mfg.); *Manufacture of Synthetic Rubber*, K. B. Davis (Goodrich); *Rubber Laboratories*, F. T. Reynolds (University of Akron); *Mechanical Rubber Goods*, N. C. Longee (U. S. Rubber); *Reclaim Manufacturing*, M. R. Batche (Xylos Rubber). All the committee chairmen are members of the Executive Committee as are the individual committee members.

Whittaker Appoints DeTurk

Whittaker, Clark & Daniels, New York, N. Y., has appointed Ralph E. DeTurk manager of its Rubber Chemicals Division. For the past six years, Mr. DeTurk has been in charge of sales for the Eastern Division of the C. P. Hall Co., and before that was general manager of the General Magnesite and Magnesia Co., Philadelphia, Penna., a subsidiary of the Philip Carey Manufacturing Co.

FIRST OPEN MEETING SINCE 1933 HELD BY RMA ON NOVEMBER 17

The Rubber Manufacturers Association held its 38th Annual Meeting on November 17, 1953, at the Waldorf Astoria Hotel in New York, N. Y. This was the first time since January 9, 1933, that the RMA had held an open meeting. Previously, open meetings had been held in conjunction with the National Automobile Show. The practice of open meetings was revived this year with a program touching on all basic fields of interest to rubber manufacturers.

Featured speaker at the meeting was Representative Paul W. Shafer (Rep., Mich.), author of the Rubber Act of 1948, who gave his appraisal of the Congressional attitude on the establishment of a free competitive synthetic rubber industry. Other interesting addresses were made by officers of the Rubber Manufacturers Association, covering various aspects of the industry.

The meeting also featured an election of directors of the Association. The following were elected directors with terms to expire in 1956: H. Gordon Smith (U. S. Rubber), C. D. Garretson (Electric Hose & Rubber), J. P. Seiberling (Seiberling Rubber), Harry E. Smith (Raybestos-Manhattan), and Thomas Robins, Jr. (Hewitt-Robins). W. S. Richardson (Goodrich) was elected a director with a term ending in 1955, while A. A. Garthwaite (Lee Rubber) was also elected a director with a term expiring in 1954.

Shafer Advises Industry

In his address, Representative Shafer stated that in contemplating purchase of government-owned synthetic rubber facilities, the rubber industry should not entertain "thoughts of quick profits, low bids, and easy negotiation." If any member of the industry thinks or acts that way, he said, he will "open the door to the greatest avalanche of condemnation ever heard on the floors of Congress."

Mr. Shafer said there is a group, active in both Houses, that desires the government to stay in the rubber business. These men, he declared, realize that Congress has absolute veto power on any bid and even the fairest bid might be rejected in a fight.

He warned the Association that their industry might be the first to succumb to "industrial socialization," and said that it is "loose thinking" to conclude that because the price of natural rubber has fallen so drastically that it would be folly to tie up capital in synthetic rubber facilities. This thinking, he stated, could lead to socialism.

Mr. Shafer said that he was convinced that the present selling price of natural rubber "may force to the wall" many small estate owners and lead to "dumping" of much rubber on the market. However, he warned, eventually this would lead to control of rubber by a few and cost the United States millions of dollars to keep Southeast Asia out of Communist hands.

"The millions of dollars we have spent in loans and grants to Southeast Asia are being poured down the drain as the result of the falling price of natural rubber and our continued government monopoly of synthetic rubber," Mr. Shafer said. If by short-sightedness the government monopoly in rubber is approved and the decline in natural rubber prices encouraged, we will have to pay for our lack of vision by increased taxes and we will continue to be dependent on the government for raw materials, he declared.

The Congressman from Michigan observed that government participation in industry, participation as contrasted with regulation, in one form or another, is bad for industry. He also warned that if the government stays in the rubber business, it may well be that it will expand and improve its own facilities and thus keep private industry out of the field entirely. More than the sale of the synthetic rubber facilities is at stake, he pointed out. It is part of the fight against big, centralized government and the free enterprise system, he emphasized.

In his address at the meeting, A. L. Viles, president of the Rubber Manufacturers Association, spoke on the subject, "The Rubber Manufacturing Industry Looking Forward to 1960." Mr. Viles is optimistic about the future of the rubber industry in the years to 1960, and predicted that we will see a substantial increase in our total requirements for rubber during those years.

He also observed that only a vigorous program of replanting in the natural rubber areas of the world and a substantial expansion of synthetic rubber producing capacity in this country can avert a serious rubber shortage over the next decade. Unless we accept that challenge, he said, we shall fail in our obligation to meet the snow-balling demand of American consumers for the goods we made.

In an address on "Will There Be Enough Rubber?", W. J. Sears, vice president of the Association, stated that it seems possible that industry can look forward with some confidence to an assured supply of material at reasonable prices, provided it takes advantage of all sources of information for intelligent planning and procurement.

Mr. Sears pointed out that price is perhaps still the most important aspect in determining the relative consumption of natural and synthetic rubber in products where they are freely interchangeable without loss in quality. However, in the years ahead, when improvements in synthetic rubber quality can be anticipated as the result of private competitive research, the problem of natural rubber quality will become more significant.

"We believe," Mr. Sears stated, "that there lies ahead a very important period of technical competition between natural and synthetic rubber. Anything that is done now to improve natural rubber quality is in the long-range interests of both natural rubber producers and consumers."

Speaks on Industrial Relations

Ross R. Ormsby, vice-president and general counsel of the RMA, in a talk on "Industrial Relations in 1954?", stated that one of the difficulties facing rubber manufacturers today in the field of collective bargaining is the pattern-type of negotiations. In recent years, companies in the rubber industry have been asked by employee representatives to negotiate agreements based upon settlements made by other manufacturers both in and outside the rubber industry.

The rubber manufacturing industry, because of its great product diversification, does not lend itself to this form of collective bargaining as may be the case in other industries. For instance, the only common denominator between a tire manufacturer and companies producing heels and soles, rubber footwear or small molded and extruded mechanical rubber goods is the raw material involved in the manufacturing processes. The production problems, marketing factors, labor costs and many other operating conditions are entirely different, Mr. Ormsby declared.

Because of the great variety of product

Shown above is a composite photograph of the head table at the luncheon which was a feature of the RMA meeting in New York.

and operating conditions, rubber manufacturers should stress in collective bargaining negotiations their own individual problems and arrive at solutions to these problems based upon the circumstances surrounding each manufacturer. This will lead to a sounder economy for our industry and inure to the benefit of the public as well as to all persons involved in the manufacture of rubber products, he concluded.

"Facts and Figures or Speculation?" was the title of an address by C. W. Halligan, treasurer of the RMA. Mr. Halligan summarized the activities of the Statistical and Accounting Department. RMA's statistical activities, he said, are restricted solely to the collection of information desired by members of the industry. Whenever a report ceases to be of value to the industry, it is always promptly discontinued.

In summary, he stated, the Accounting and Statistical Department is the most general of the Association activities in that it works in all branches of the industry, while, at the same time, it is the most specific of the Association activities in that it works almost entirely through facts and figures.

George Flint, secretary of the RMA, also spoke at the meeting, presenting a talk on "Operation Cooperation." The speaker described the operations of the organization and its divisions. He stated that RMA has 161 individual members representing 85% of the country's consumption. Many of these members confine their activities to a single type of product, but a number have quite diversified production, he pointed out.

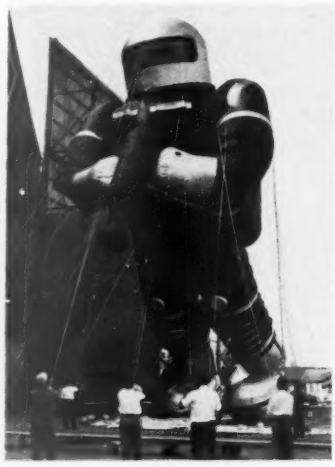
Other than the various talks and the election of directors, the meeting featured a panel discussion in which the entire RMA staff invited questions and constructive suggestions from the floor on all phases of RMA activity. The meeting also featured a luncheon.

Reorganizes Industrial Division

To provide a more complete and specialized service to customers of friction, gasket and packing materials, the Industrial Division of the Armstrong Cork Co. has announced the formation of one new department and the consolidation of two others. A new Friction Materials Department has been formed to handle the division's expanded sales effort in the fields of power transmission and power braking. Ralph M. Hill, former department manager for cork and rubber products, is in complete charge of development and sales work for the new department. The Cork and Rubber Products and the Cork Products Departments have been merged to form the Gasket and Packing Department. C. B. Grove, department manager for cork products, has assumed sales responsibility for all gasket materials—cork composition, cork and rubber, synthetic rubber, Accopac and felt. According to Armstrong, consolidation of the two departments under one manager will result in a coordinated and uniform approach to all gasketing activity. In addition, the company feels that the move will prove helpful in developing over-all research and advertising programs.

"Spaceman" Features Macy Parade

"Spaceman," a figure balloon constructed by the Aviation Products Division of the Goodyear Tire & Rubber Co., highlighted R. H. Macy's 27th annual traditional pre-Christmas parade on Thanksgiving Day in New York City. The comic balloon is 70 feet tall and 40 feet from side to side. Some 15,000 cubic feet of helium are required to inflate him section by section. About 25 gallons of paint were used to cover "Spaceman" which contains 600 yards of rubberized fabric. His body is black while his head, legs and feet are



aluminum colored. Jet fuel tanks on his back are orange. Joining "Spaceman" in this year's parade were five other Goodyear-made figure balloons. They are "Soldier," "Clown," "Dachshund," "Mighty Mouse" and "Fish." The Goodyear figure balloons first appeared in the Macy parade in 1928. Tony Sarg, famous New York artist, originated the idea with his paper mache comic figures. Despite their immense size, the balloons are handled with ease when inflated. During the parade, they are floated some 20 feet over the spectators with crews of up to 40 men holding guide lines.

Vinyls Gaining in Shoe Use

The Plastic Coating & Film Association reported after a recent survey of the shoe market that plastics materials are being adopted by some manufacturers specifically for their appearance and wear qualities rather than for price advantage alone. Unexcelled wear and abrasion resistance and color fastness were cited by these manufacturers as reasons for the use of vinyl-coated materials in uppers. The volume in vinyl-coated fabrics today is in fine leatherlike grainings. Plastic patent is being offered with a softer hand and finer texture. Producers of vinyl-coated materials have also developed a selection of straw and rattan surface effects. While most of these plastic fabrics are in natural colors there are striated effects in yellow and black, tan and brown, black and white, and red and black. Other novelty effects are tweed finishes, corde weave effects, and small geometric hard weave surface textures.

Staudinger Wins Nobel Prize

Hermann Staudinger, 72, professor emeritus of organic chemistry at the University of Freiburg, West Germany, has received the Nobel prize in chemistry for 1953 for his work in developing the chemistry of high polymers. The prize is worth $33,840, and was presented by King Gustav Adolph in Stockholm, Sweden on December 10. In pioneering high polymer chemistry, Professor Staudinger has been described as "penetrating one of the most inaccessible fields of organic chemistry, lifting a corner of the veil covering the mysterious world of giant molecules." His work has led to new concepts of polymeric materials and has contributed to the development of the plastics industry.

Professor Staudinger broke with tradition when he proposed the thesis that amorphous, natural compounds such as rubber, etc., are actually large molecules rather than simple aggregates of small molecules. It was he who proposed the word, macromolecule, and in 1940 he established at Freiburg, the Institute for Macromolecular Chemistry, of which he is still director. That same year he also founded the first journal devoted solely to that subject.

The word macromolecule first appeared in the report of his studies on rubber in 1922. He had been concerned for some years about a theory by Harries that rubber consisted of rings of dimeric isoprene molecules. X-ray diagrams of stretched rubber indicated a fiber structure, and Professor Staudinger felt it should be possible to hydrogenate rubber to a paraffin-like material. He was eventually able to do it—with a nickel catalyst at 270°C. and 100 atmospheres—and thereby welded the first link in his "chain" theory.

Another big contribution was the Staudinger rule of viscosity, which states that the specific viscosity of a polymer solution is proportional to the molecular weight. The rule was received with doubt when it was proposed because it was based on work with low molecular weight polymers. As reliable molecular weight determinations by ultracentrifuge and osmotic pressure methods became available, the application of the rule to straight-chain high poymers was vindicated. It has since found widespread acceptance in theoretical and industrial work.

Develops New Bonding Process

A process for bonding nitrile and neoprene rubbers to Zamac materials, white metals and aluminum as well as nylon has been developed by Minnesota Rubber and Gasket Co., Minneapolis, Minn. It is the first time these materials have been successfully bonded, according to company officials. In developing the metal bonding process, Minnesota Rubber research engineers also discovered the technique for bonding certain rubber compounds to nylon, the company stated. The rubber-to-metal process is already being used by the firm to produce phonograph drive wheels. The nylon bonding technique—also perfected for the first time—is expected to eliminate need for metal inserts where nylon is used as a bearing for rubber parts.

Lockwood Re-Establishing Firm

Warren S. Lockwood

Warren S. Lockwood will resign as president of the Natural Rubber Bureau, Washington, D. C., on December 31 to re-establish the international public relations firm of Warren S. Lockwood Associates, previously known as W. S. Lockwood, Inc., at 1417 K Street, N.W., Washington 5, D. C. He will be succeeded as president of the Natural Rubber Bureau by H. C. Bugbee, now vice-president. Beyond this, there will be no change in staff or function of that organization. Mr. Lockwood became president of the Natural Rubber Bureau some three years ago. At that time, the Bureau was an account of Mr. Lockwood's company. Mr. Lockwood's new organization, which will carry on the world trade and international public relations activities of its predecessor, will again be retained by the Natural Rubber Bureau as consultant in all of its activities.

Galvicon Galvanizing Process

Galvicon Corp., New York, N. Y., has introduced what is said to be an entirely new method of cold galvanizing for the surface protection of steel and iron. This new process, which utilizes cold galvanizing compound, is not a paint but rather a coating which may be applied with an ordinary paint brush, electric spray or cold dip. Iron or steel surfaces coated with "Galvicon" create an electro-chemical union, thereby uniting the zinc with the base metal's surface. It differs from other so-called metallic paints containing zinc in that it actually combines with the base metal, setting up electrical continuity. It leaves a coating in excess of 96 parts by weight, of chemically pure zinc, which is the minimum zinc content for true galvanic protection.

Introduces New Mattress Line

U. S. Rubber Co. is extending its line of foam mattresses by introducing a new Koylon foam mattress with matching foundation that will retail at prices below the "Platinum Label" line. The new mattress and foundation will be sold as "Gold Label Koylon." This latter mattress is reversible, cored on both sides and covered with attractive ticking. The foundation is especially designed for the mattress.

Naugatuck Aromatics Sold

The assets of the Aromatic Chemicals Department of the Naugatuck Chemical Division, U. S. Rubber Co., have been purchased by Roubechez, Inc., New York, N. Y., at an undisclosed purchase price. The rubber company's Aromatic Chemicals Department, which operated under the name of Naugatuck Aromatics, processed aromatic chemicals, imported essential oils and compounded finished specialties for the perfume industry. Its purchase by Roubechez, also in the aromatic chemical and essential oil business, included equipment, chemical processes, and inventories, but no real estate. Roubechez officials stated that the acquisition of Naugatuck Aromatics will permit the firm to complete its line of products and will allow for an increase in the sales service organization. The firm will now have sales offices in Cincinnati, Chicago, New York and Toronto, Canada. The manager of Naugatuck Aromatics, Harold J. Edmon, has become a vice-president of Roubechez, and the chief perfumer, Roy J. Huttleston, and the entire Chicago office of Naugatuck Aromatics have joined Roubechez. Francis H. Sloan is president of the company.

Lehmann Acquires Wm. R. Thropp

J. M. Lehmann Co., Inc., of Lyndhurst, N. J., manufacturers of roller mills and other machinery for the process industries, has acquired certain rights, title and interest in the Wm. R. Thropp & Sons Corp. of Trenton, N. J., including manufacturing rights and rights to the use of the Thropp company name. The latter company will be operated as the Wm. R. Thropp & Sons Division of J. M. Lehmann Co., Inc. All manufacturing and service facilities for Thropp products will be concentrated at the Lehmann plant in Lyndhurst. H. F. Croot, Jr., director of sales, and William Wilkes, field service representative of the Thropp firm, will retain the same titles and responsibilities in the new division of the Lehmann concern.

News in Brief

Dewey & Almy has issued a technical data sheet covering its Darex plasticizer, dibutyl maleate. Ask for Bulletin W-8.

"Sunolite No. 127", a selected blend of waxy hydrocarbons designed for the mechanical and automotive rubber goods industries, is described in Technical Service Bulletin R-10 released by the Witco Chemical Co.

Complete physical specifications of eight "Solvents Engineered for Safety" are shown on a single consolidated data chart offered by the John B. Moore Corp., Nutley, N. J.

DuPont has announced that prices of the most widely used grades of "Alathon" polyethylene resin will be reduced 3c a pound as of December 1. This brings the price of natural Alathon resins for molding and extrusion to 46c a pound.

Named Plasticizer Sales Head

Duncan J. MacLennan

Duncan J. MacLennan has been appointed sales manager of the Plasticizer Division of the Pittsburgh Coke & Chemical Co., Pittsburgh, Penna. Mr. MacLennan has been sales representative of the division in the New England area. Before joining the company, he was sales research and planning manager for the Whitney Chain Co., Hartford, Conn., and was also associated with the Godfrey L. Cabot Co. of Boston, Mass. Pittsburgh Coke has also announced that James F. Hall, Jr., has been appointed a sales representative for the Plasticizer Division in the Pittsburgh area. Mr. Hall received his degree in chemical engineering at the University of Pittsburgh in June, 1953.

Building New Kralastic Plant

Ground has been broken in Baton Rouge, La., for new production facilities for Kralastic, a resin-rubber plastic deevloped by the Naugatuck Chemical Division of the U. S. Rubber Co. The new facilities, an addition to Naugatuck Chemical's plant, will triple the output of Kralastic, the company stated. They are expected to be in operation by July, 1954. "Demand for this plastic, used in industrial piping and numerous other extrusion and injection molding applications, has increased so steadily that we have decided to enlarge our production," John E. Caskey, vice-president and general manager of the division, said. A thermoplastic material, Kralastic retains much of its toughness and high impact strength at temperatures as low as —60° F. It is available in many colors.

Rocket Propellant Research

Basic research in rocket propellants is now being conducted in the Research Center of the B. F. Goodrich Co. at Brecksville, Ohio, according to a recent announcement. Construction of a new laboratory, adjacent to the group of buildings comprising the Research Center, has been completed and studies are currently under way there, the company said. An inspection team, headed by Colonel E. H. Harrison of Washington, D. C., recently toured the new research facility and met with Goodrich officials and members of the company's research staff.

ONTARIO-KITCHENER MEETING HEARS ADDRESS BY HOWLAND

On November 10, the Kitchener Rubber Group and the Ontario Rubber Section of the Chemical Institute of Canada held a joint meeting in the Berkley Room of the P.U.C. Building in Kitchener, Ont., Canada. The meeting was addressed by Dr. L. H. Howland, manager of synthetic rubber research and development for the Naugatuck Chemical Division of the U. S. Rubber Co. Dr. Howland spoke on "Recent Developments in Cold Rubber."

This paper reviews work carried out since the development of cold rubber by groups cooperating in the U. S. Government synthetic rubber program sponsored by the Office of Synthetic Rubber, Reconstruction Finance Corporation. Dr. Howland observed that development work on polymerization recipes since the first high sugar cold rubber formulas has resulted in low sugar and sugar-free iron pyrophosphate activated systems, polyamine activators using only a trace of uncomplexed iron and, most recently, a low iron, sulfoxylate activated recipe. Considerable development has also taken place in the shortstop field, resulting in the use of the non-discoloring, water soluble dithiocarbamates or their combinations with polysulfides or polyamines.

The development of very fast polymerization recipes coupled with engineering studies on heat exchange systems has shown the feasibility of employing conventional heat exchangers or pipeline polymerizers for preparation of cold GR-S in very short reaction cycles. An outgrowth of this work has been the use of internal heat exchangers in the present plant reactors, allowing successful control of 6 or 7 hour reactions.

Non-discoloring polymers have been made possible by the use of the dithiocarbamate shortstops and non-discoloring, non-staining antioxidants, and have been placed in commercial production. Special processing techniques have allowed the production of low water adsorption polymer for use in the wire and cable industry. Low styrene rubbers have been developed for articles subjected to extremely low temperature service, he stated.

A major development in GR-S technology has been made by the incorporation of relatively large amounts of low cost oils into high viscosity polymers. The resulting masterbatches are easily processable and have vulcanizate properties about equivalent to standard cold rubber. These oil masterbatches have been widely accepted commercially. In some applications the use of rosin acid type extenders has given greatly improved properties. Three component masterbatches of polymer, carbon black, and extender have been developed. Homogenization of standard latex-carbon black masterbatches by violent agitation has resulted in tire treads with improved wear resistance. Steam jet dispersion and use of carbon black collected directly in water from the burners have also given improved tire wear.

Cold latex gives cast film vulcanizates with tensiles of 3000 psi compared to 300-500 psi for similar hot latex films. High Mooney viscosity polymer has been found necessary for optimum properties in some latex applications. The high Mooney viscosity was found to contribute to latex instability, but this problem has been largely overcome by formula changes, Dr. Howland concluded.

ELASTOMER AND PLASTICS GROUP HEARS LALK ON FILM FORMATION

The Elastomer and Plastics Group of the Northeastern Section of the American Chemical Society held its second meeting of the season on November 17 at the Massachusetts Institute of Technology in Cambridge, Mass., with about 75 members and guests in attendance. Principal speaker of the meeting was Robert H. Lalk of Coatings Technical Service, the Dow Chemical Co., Midland, Mich. Mr. Lalk spoke on "The Mechanism of Film Formation from Synthetic Latexes." An active question and answer period followed Mr. Lalk's talk.

Mr. Lalk stated that the very rapid growth during the last five to seven years in the use of latex as a raw material in nearly every field of coating has presented many formulators with a material which works differently than any they have worked with before. The vehicle or binder is suspended as very fine particles in a water system, and in order to form a useful coating, these resin particles must flow together during drying and fuse into a continuous, tough water-resistant film.

A moving picture showing the behavior and attractions between particles of a latex during drying was shown to help illustrate how this process works. Electron microscope pictures of films were used to show the effects of some variables, such as monomer, ratio, plasticizer modifications, and drying temperatures.

Electron microscope photographs of latex paint films were also used to show how pigment particles are included within the film of the latex vehicle after drying.

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WASHINGTON HEARS PAPER ON USE OF RUBBER IN PACKAGING

The Washington Rubber Group held its November 18th meeting in the auditorium of the Potomac Electric Power Co. Building in Washington, D. C. Featured speaker at the meeting was Charles J. Zusi, president of Container Laboratories, Inc., Chicago, Ill. Mr. Zusi spoke on "Rubber in Packaging." A question and answer period followed the talk.

In his address, the speaker observed that rubber in packaging usually appears as a part of or as an accessory to the container which acts as a package. As an adhesive, it provides water and moisture resistance, while in coatings and films it serves these purposes even better. Caps and seals on bottles and jars can be made leakproof because of rubber products. Bags of rubber films make fiber drums and fiberboard boxes water-tight. Rubber cushioning materials protect many kinds of delicate electronic equipment. Some of the newer military weapons can be shipped successfully only because shock isolation devices utilizing rubber have been developed. Research now being conducted will expand the uses of rubber products as cushioning materials and for combatting shock and vibration, Mr. Zusi said.

The packaging of synthetic rubbers is a difficult problem requiring thorough and comprehensive study in order to arrive at a solution which will meet the required conditions at a reasonable cost. The rubber appears to be solid but when exposed to heat and pressure it flows and adheres firmly to anything in its path. Talc or soapstone used to prevent adhesion causes a dust hazard to workers. Film wrappers adhere to the rubber and, therefore, must be compatible with it but, unfortunately, they are not miscible under all of the conditions existing in the plants of rubber compounders and fabricators.

The package must be capable of performing satisfactorily when subjected to long periods of storage at summer temperatures because this rubber is an important strategic material. A nation-wide investigation, including laboratory tests and field trials has as its purposes the satisfactory solution of this baffling problem, the speaker concluded.

Plans Carbon Black Symposium

The Akron Rubber Group at its meeting at the Mayflower Hotel in Akron, Ohio, on January 29, 1954, will present a symposium on "Carbon Blacks." A panel of experts has been assembled, and the moderator for the session will be Dr. R. P. Dinsmore, vice-president in charge of research of the Goodyear Tire & Rubber Co. Panel members will include the following: F. H. Amon (Godfrey L. Cabot), C. A. Carlton (J. M. Huber), Leslie Carver (Witco Chemical), Dr. I. Drogin (United Carbon), G. C. Maassen (R. T. Vanderbilt), John W. Snyder (Binney & Smith), L. Sperberg (Sid Richardson Carbon), and Merton Studebaker (Phillips Chemical). A social hour will be held immediately following the symposium. This in turn will be followed by a dinner and a program of entertainment.

500 INTERESTING EXHIBITS FEATURE CHEMICAL EXPOSITION

Almost 500 exhibits covering nearly five acres featured the 24th Exposition of Chemical Industries which was held from November 30 to December 5 at the Commercial Museum and Convention Hall in Philadelphia, Penna. The displays comprised chemical substances, chemical materials, structural and protective materials and coatings, construction materials, chemical process equipment, material handling, production equipment, laboratory supplies, research and testing instruments and controls. Some 240 different classifications of exhibits were catalogued, with one to more than one hundred exhibits listed in each class.

Chemicals represented ranged from rare and refined substances available only for research, through reagents for the laboratory to the commercial grades available in quantities. Materials were shown in rare and fabricated forms and in parts shaped to customer specifications. Specialties, such as instruments, laboratory equipment and supplies were demonstrated in finished form and in working models and animations.

A large part of the exposition was given over to production equipment, exhibited for the most part in complete units, ready for installation in plants, but frequently demonstrated by cutaway models, transparent sections revealing material in simulated processing or by flow charts and action displays. Taken as a whole, there was scarcely a single processing step or treatment used by the chemical processing industries that were not represented by at least one exhibit at the exposition.

It would seem that the use of reinforced plastic resins is increasing, with a number of companies swinging to the manufacture of reinforced resin tanks, ducts and similar units. Such plastics materials as the polyesters, furfuryl alcohol and epoxy laminates are being reinforced with synthetic organic fibers as well as glass mats and glass fibers.

Rubber processing chemicals were on exhibit by many manufacturers, Emery Industries, for example, had a display of the ozone-oxidation process for manufacturing azelaic and perlagonic acids. Plasticizers, high stability fatty acids, an improved polymerized fatty acid, and several other new development products were shown.

Other rubber chemicals were shown by Ansul Chemical, Atlas Powder, Commercial Solvents, Hercules Powder, National Lead, Victor Chemical, C. P. Hall, Monsanto, and others.

The Protective Coatings Division of Metalweld, Inc., showed a general line of protective coatings from sheet linings for heavy corrosives, to sprayed coatings. Coatings and linings of flame sprayed Thiokol, sprayed saran and sprayed neoprene were also shown. Monomer-Polymer, Inc., showed a line of monomer products and applications including rubber, plastics and intermediates.

Colonial Plastics Mfg. Co. showed a line of nonplasticized polyvinyl chloride pipe and fittings. Included in their display were ducts, tanks, hoods, tank liners and plating racks made of PVC. Liners in pump body blocks made of polyethylene, nitrile hard rubber, etc., were shown by the Vanton Pump & Equipment Corp.

Johns-Manville displayed its recently developed polyvinyl tape, designed as a protective wrap for gas and oil pipelines and overhead piping.

Complete lines of laboratory equipment, supplies and furniture were exhibited by many of the leading companies in the field, among them, Baker & Co., Fischer & Porter, Scott & Williams, Standard Scientific Supply, and others.

Recording, controlling and indicating instruments were attractively displayed by manufacturers at the exposition while indicators of many different types were also to be seen. To be seen was an ultrasonic viscometer, which indicates instantaneously on a meter dial the viscosity of solutions. Another new viscometer claims an accuracy of ¼ of 1%. It has been successfully applied to reactor polymerization processes.

Of particular interest to the rubber and the plastics industries were many of the mills, mixers and other processing machinery and equipment to be seen at the exposition. Also seen were complete lines of material handling equipment, dust control units, refrigerating equipment, etc.

Rubber products and equipment were also prominently on display at the exposition by such companies as American Hard Rubber, Automotive Rubber, Garlock Packing, Johns-Manville, Maurice A. Knight, Charles Ross and Son, U. S. Stoneware, and others.

Hammon Joins Erie Foundry

Carl Hammon

Erie Foundry Co., Erie, Penna., has announced that Carl Hammon, formerly associated with the Watson-Stillman Co. for a period of eighteen years, has joined the engineering staff of its Hydraulic Press Division.

Sharples Moving Offices

On December 21, 1953, Sharples Chemicals Inc., formerly located at 123 South Broad St., Philadelphia 9, Penna., will move to new executive offices at 1100 Widener Building, Philadelphia 7, Penna.

DETROIT HOLDS FALL MEETING; NAMES NEW OFFICERS FOR 1954

The Detroit Rubber and Plastics Group held its Fall Meeting on October 2 at the Detroit-Leland Hotel in Detroit, Mich., at which time a program was presented on "Who is the First Inventor?" On November 30, the group announced its new officers for the 1954 season and the composition of its Executive Committee for that year. New officers for the 1954 season are: *Chairman,* W. J. Simpson (Chrysler); *Vice-Chairman,* J. T. O'Reilly (Ford); *Secretary,* H. W. Hoerauf (U. S. Rubber); *Assistant Secretary,* E. W. Tillitson (Wayne University); *Treasurer,* W. F. Bauer (Brown Rubber); *Assistant Treasurers,* H. F. Jacober (Baldwin Rubber) and W. F. Miller.

All the officers are members of the Executive Committee as are the following members who head the various activities noted: J. B. Craft and H. A. Weil (Membership); R. C. Chilton and H. W. Neale (Entertainment); H. V. Vodra, W. A. Wiard and J. B. Ledden (Program); D. A. Koza and J. D. Skandalaris (Publicity); E. J. Kvet, L. A. Jarvis, J. F. Stiff, W. D. Wilson, and C. C. D'Hilster (Educational Activities); T. W. Halloran (Historian); G. F. Lindner, G. P. Hollingsworth and E. V. Hindle (Counselors).

The program at the October 2 meeting consisted of a skit involving important points of patent law. It was presented by W. H. Gross of the Patent and Legal Department of the U. S. Rubber Co. in cooperation with the Michigan Patent Law Association. G. W. Talburtt of the Chrysler Corp. and P. F. Seibold of Harness, Dickey & Pierce also participated in the program.

Connecticut Hears Fowler

Approximately 180 members and guests attended the November 18th meeting of the Connecticut Rubber Group held at the Golf Club of the American Brass Employees Association, Inc., Naugatuck, Conn. Guest speaker for the meeting was Donald Fowler of the Naugatuck Chemical Division of the U. S. Rubber Co. Mr. Fowler spoke on "Practical Applications of Latex," and presented an over-all view of the types of latices commercially or potentially available. Various factors that influence the colloidal properties of the latices and the physical properties of the polymers were discussed. These included such matters as monomer selection, types of polymerization, emulsifier systems and particle size and their influence on the properties of consumer articles made from latices and on the processes used for making these products. A number of processes involving latex uses were described and samples of finished articles shown. These included sponge rubber, rubber thread, dolls and toys, upholstery fabrics, carpets, tire cord, paint, artificial leather, and others.

Goodyear has announced production increases in vinyl flooring because of a steadily growing consumer and dealer acceptance since the line was first introduced in 1947.

THIRD RUBBER TECHNOLOGY CONFERENCE TO BE HELD IN LONDON IN JUNE

The Institution of the Rubber Industry is holding a third Rubber Technology Conference at the Church House, Westminster, London, from June 22 to 25, 1954. The conference will be international in character and papers will be read by leading rubber technologists from several countries. As there have been many post war developments which are now ready to be announced and discussed, the 1954 conference holds promise of being of real value to the industry.

There appears below a preliminary note about the authors of the papers and the kind of problems which will come under consideration, grouped under six headings. Before the conference opens, short non-technical summaries of each paper will be prepared, describing its general significance both as regards some particular industry and also from the viewpoint of the average reader. As this is advance information, it is by necessity provisional and it may be found that, at a later date, non-technical summaries will contain one or two additional items. A summary of the subject matter of the conference follows:

(1) Properties of Natural Rubber Latex: These papers describe recent research into the properties of rubber latex, with particular reference to problems associated with the earlier stages of the production of natural rubber in the Far East.

Seven papers have been scheduled on this subject, with the following authors: T. S. Roberts (BRPRA), E. W. Madge (J. L. M. Newnham), H. M. Collier (Dunlop Research Centre), R. Freeman (RRI), J. E. Morris (RRI), R. H. Smith (RRI), Dr. M. Van den Tempel (Rubber-Stichting), and Dr. W. L. Rosing (IRRI).

(2) Production and Evaluation of Synthetic Rubber: This section deals particularly with the production and properties of synthetic rubber. Some of the authors will discuss new methods of making synthetic rubber, which recent research work has brought to light.

Six papers have been scheduled on this subject, with these authors: W. Cooper, T. B. Bird and E. Catterall (Dunlop Research Centre), Avery A. Morton (M. I. T.), I. D. Patterson (Goodyear), W. B. Reynolds, J. E. Pritchard and J. F. Svetlik (Phillips Petroleum), Bo Sarno (Liljeholmens Kabelfabrik), and R. B. MacFarlane and L. A. McLeod (Polymer Corp.).

(3) Chemistry of Rubbers: The papers on this subject will discuss much new knowledge of the structure of rubber (mostly in the field of natural rubber) which has been made available by the latest advances in the chemical field.

Seven papers will be heard on this subject, with these authors: M. Gordon and J. S. Taylor (Royal Technical College), R. L. Stafford (Imperial Chemical Industries), W. H. T. Davison and G. R. Bates (Dunlop Research Centre), Dr. G. F. Bloomfield and F. M. Merrett (BRPRA), Dr. L. Bateman, R. W. Glazebrook, C. G. Moore and R. W. Saville (BRPRA), S. Baxter, P. D. Potts and H. A. Vodden (Monsanto Chemicals, Ltd.), and Dr. H. W. Robinson and Mr. Vodden (Monsanto Chemicals, Ltd.).

(4) Physics of Rubber and Fibers: The papers in this category cover a very wide field and deal both with the properties of rubber as well as with those of the various natural and synthetic fibers used in conjunction with rubber. With some of the papers in this field it will be found that there is a fairly close link with practical affairs.

Eight papers have been scheduled in this category, with these authors: J. O. Wood and W. F. Kilby (Dunlop Research Centre), W. P. Fletcher, A. N. Gent and R. I. Wood (BRPRA), L. Mullins and N. R. Tobin (BRPRA), A. R. Payne (RABRM), D. M. Turner (Avon India Rubber), P. Thirion (Institut Francais du Caoutchouc), and H. J. J. Jansen (Rubber-Stichting).

(5) Developments in Testing Methods: Many of these papers deal with modern developments in the method of testing rubber products, and as such will be of direct interest to the users of such products. In addition, one of them describes an interesting new technical product resulting from long-term research into the physical properties of rubber.

Seven papers have been scheduled on this subject, with the following authors: C. H. Leigh-Dugmore (Dunlop Research Centre), E. F. Powell and S. W. Gough (Dunlop Research Centre), D. G. Marshall (Dunlop Research Centre), J. I. S. Williams and R. G. Clifton (Dunlop Test House), H. L. F. Jenkins and D. H. Cooper (Dunlop Research Centre), L. Sperberg (Sid Richardson Carbon), and H. C. J. de Decker.

(6) Compounding: Theory and Practice: These papers will deal with the most recent discoveries in rubber compounding, with particular reference to studies of the way in which the wear resistance of rubber is influenced by reinforcing agents.

Six papers have been scheduled on this subject, with these authors: Mrs. I. Sagajllo (London Advisory Committee), Dr. V. A. Garten (Division of Industrial Chemistry—Australia), Merton L. Studebaker (Phillips Chemical), Dr. J. van Alphen (Rubber-Stichting), and Dr. G. J. van Amerongen (Rubber-Stichting).

Rodney Hunt Appoints Davis

W. C. Davis & Associates, Atlanta, Georgia, has been appointed agent in the Southeast for the Process Equipment Division of the Rodney Hunt Machine Co. Headed by Walter C. Davis, the organization will have complete sales engineering and marketing responsibility for the patented Rodney Hunt Turba-Film Evaporator and the Rodney Hunt-Luwa Spray Dryer, as well as other stainless steel processing equipment. Mr. Davis has had more than 15 years of experience in chemical and allied industries following his graduation from the University of Tennessee with a degree in chemical engineering. At various times he has been associated with DuPont, Allied Chemical & Dye, American Machine and Metals, and the Sharples Corp. At Sharples, Mr. Davis served as manager of the Process Engineering Department.

Develops New Plastic Doors

Rugged plastic doors that will save hundreds of pounds of dead weight and will not freeze closed have been developed for insulated trucks. The doors were designed by Weber Industries of Long Island City, N. Y. They are being made by Americana Enterprises of Stamford, Conn., from Fiberglas and Vibrin, a polyester resin produced by the Naugatuck Chemical Division of the U. S. Rubber Co. The new doors are molded in a single pan-like section, in contrast to the layers of wood and metal used to make conventional insulated doors. The pan is then filled with insulation and faced with a sheet of aluminum on which the necessary hardware is attached. Frames, or "bucks" for the doors are also being made from the same reinforced plastic construction. A large, "walk-in" type door of this construction weighs 55 pounds, about a third the weight of a metal and wood door. Hardware and aluminum facing brings this weight to approximately 75 pounds.

The low water absorption of reinforced plastic, which prevents swelling or shrinking, permits the door and frame to be molded with only 1/16 inch clearance—less than half the usual clearance for insulated doors. This minimizes moisture buildup around the door edges, and helps prevent the accumulation of ice which often freezes the door to the frame. The insulation qualities of reinforced plastic, and the smooth molded surface on which ice cannot easily grip, also help prevent the door from freezing fast to the frame. Freezing is a problem because drivers usually "fix" the condition on the spot with a tire iron, generally damaging the door permanently.

Other advantages of the new doors are no rotting, no odor absorption, easy to clean, no damage from steam cleaning, and strong enough to take heavy impacts. The doors, which are being made in several sizes, are also impregnated white for sanitary reasons. They are expected to cost five to ten percent more than conventional doors.

Reorganizes Development

American Cyanamid Co., N. Y., N. Y., has announced the reorganization of its development functions. Under the new organization there will be three departments: the Fiber Development Department, with C. W. Bendigo as manager; the Market Research Department with Borden R. Putnam, Jr., as manager; and the New Product Development Department with Dr. Nolan B. Sommer as manager. Mr. Bendigo will supervise commercial evaluation of experimental textile fibers developed by the company. These so far, have included acrylic fibers all known by the experimental designation of "X-51." Mr. Putnam will supervise market surveys to determine the advisability of plant expansions, product diversification and development of new products, as well as long-range studies on development of new raw materials, processes and products. Dr. Sommer will be in charge of the development of markets for new products available from the firm's research laboratories and pilot plants.

Goodrich Promotes Schoenfeld

Dr. Frank K. Schoenfeld

Dr. Frank K. Schoenfeld, vice-president of the B. F. Goodrich Chemical Co., a division of the B. F. Goodrich Co., has been elected vice-president in charge of research of the parent company. Dr. Schoenfeld will assume his new duties on January 1, 1954, on the retirement of Dr. Howard E. Fritz, who has directed Goodrich research since 1946. Dr. Schoenfeld joined the company shortly after his graduation from the University of Michigan in 1927 as a chemical engineer. He later earned master's and doctor's degrees in chemistry from Western Reserve University. Following early research work in vinyl resins, he was appointed manager of Koroseal research and development in 1939, heading a research team that developed new processes for producing several types of vinyl chloride. In 1942 he became director of Koroseal and plastics research. Since that time the development of many variations of vinyl resins has been carried on under his supervision.

In 1944 Dr. Schoenfeld became director of technical and development work for the chemical company and in 1946 was named a vice president of that division. During World War II and since, Dr. Schoenfeld has been responsible for all technical operations in three synthetic rubber plants operated for the government by B. F. Goodrich. He is the author of a number of technical papers, and is the holder of patents in the fields of pigments, adhesives, rubber derivatives, polymerization, synthetic rubbers and plastics. Dr. Schoenfeld is a member of the American Chemical Society and the American Institute of Chemical Engineering.

Dr. Fritz joined the company in 1925 after having served on the engineering school faculty at Ohio State University. In 1934, he took over the direction of the development and sale of "Koroseal" and in 1946 was elected a vice-president of the company in charge of research.

Shell Chemical Moves Offices

Shell Chemical Corp. has announced a move of its Eastern Division and New York District offices from 500 Fifth Avenue, New York 36, N. Y., to 380 Madison Avenue, New York 17, N. Y. The new telephone number is Oxford 7-3311.

Interhandel to Appeal Suit

Interhandel, a Swiss investment company, has announced that it will appeal a U. S. District Court decision dismissing its suit for recovery of 90% of the stock of the General Aniline & Film Corp., formerly held by Interhandel and now held by the Office of Alien Property. The attorney for Interhandel said that his company has made every imaginable effort to produce the records called for, and up to the time of the judge's decision, had produced 63,658 original documents. Earlier, the U. S. District Court in Washington had ordered the suit dismissed on the ground that the company had failed to comply with court orders to produce certain documents. The suit had been pending since 1948. In 1942, the Alien Property Custodian seized 97% of the General Aniline stock, contending that the company was controlled by I. G. Farben Industries, the German chemical trust.

Introduces New Acrylic Monomer

Rohm & Haas Co., Philadelphia, Penna., has announced the introduction of a new acrylic monomer, stearyl methacrylate, as well as substantial reductions in the price of butyl acrylate, 2-ethylhexyl acrylate, and lauryl methacrylate. According to a company spokesman, the lower prices reflect the fact that sales of these products have progressed beyond the development stage and are now at the starting point of commercial volume. These higher molecular weight acrylic monomers are said to be of interest in internally plasticized copolymers where the end use requires absolute permanence as in the case of food packaging, for example. They also are reported to be useful in coatings, heat- and oil-resistant acrylonitrile copolymers for specialty rubbers and butadiene copolymers for low-temperature rubbers.

Temporarily Closes Laboratory

Farrel-Birmingham Co., Ansonia, Conn., has announced that its Processing Laboratory will be closed until March, 1954. For many years, this laboratory has been located in the company plant at Derby, Conn., where its facilities have been extensively used by manufacturers to run tests to develop new products or processing techniques. During the shutdown period, the laboratory will be moved to larger quarters adjacent to the company's general offices at Ansonia, where new equipment will be added and the facilities generally improved to broaden the scope of service to those who use it. The company will announce the reopening of the laboratory at a later date.

Ferro Names Palmer Supplies

Ferro Chemical Corp., Bedford, Ohio, has announced the appointment of the Palmer Supplies Co. of Cincinnati, Ohio, as sales agent for the Cincinnati, Indianapolis and Dayton territory for their products of metallic soaps, driers, vinyl stabilizers and fungicides to the plastics, paint and other industries. Warehouse stocks will be carried in Cincinnati.

Nelson Retirement Announced

William G. Nelson

William G. "Bill" Nelson, consultant to the technical director of production of the Tire Division, U. S. Rubber Co., retired at the end of November. Mr. Nelson, widely-known in the tire industry, was with U. S. Rubber for nearly 39 years. Born in Ottawa, Kansas, Mr. Nelson worked in the wheat fields to pay for his education at Ottawa University, where he received his B. S. in chemistry and physics. He later received his M. S. in physics and mathematics from the University of Kansas, and in 1937, Ottawa University conferred upon him an Sc.D. degree. Mr. Nelson started with the company in 1915 at Detroit as a chemist. He was product control manager at Detroit for 16 years and technical director of production for the Tire Division for nearly 5 years. A farming and hunting enthusiast, Mr. Nelson will spend his future time doing research in horticulture and animal husbandry in connection with Michigan State College. He is a member of the American Chemical Society, the Engineering Society of Detroit, the Division of Rubber Chemistry of the American Chemical Association, past-president of the Detroit Rubber and Plastics Group, past-president of Detroit Chemists, a member of the Audubon Society and the Palestine Lodge, F. & A. M.

2nd Basic Materials Exposition

The second Basic Materials Exposition, the product development show which had its premiere in New York City in June, will be held at the International Amphitheater in Chicago, Ill., on May 17 to 20. Attendance at the first show exceeded advance estimates by a large measure. As a result, the second exposition will be considerably larger and broader in scope. Exhibition space will be more than doubled and the number of participating companies will be increased by about 50%. Seventy companies contracted for display space prior to the announcement of the second show. Exhibits are limited to companies producing the basic materials which go into the making of other products. Concurrently with the show, the Basic Materials Conference will be held. Advance registration cards may be obtained from Clapp & Poliak, Inc., 341 Madison Avenue, New York 17, N. Y.

GOODRICH ISSUES REPORT ON MUD-SNOW TIRE TESTS FACTS

The B. F. Goodrich Co. has taken issue with a report issued in 1950 by the National Safety Council which concluded that mud and snow tires have little advantage over conventional tires in starting and stopping on ice or hard packed snow. What the report does not reveal, Goodrich stated, is the showing made by its tires in the tests in which competitive tires were also used. The findings were then consolidated in the pamphlet containing the report.

Goodrich notes that as it happened, the performance of its mud and snow tires used in the NSC tests was "head and shoulders" above the average of the mud-snow tires tested. These figures, however, cannot be revealed since Goodrich and the other companies whose tires were used in the tests, agreed with a NSC request not to make the individual figures public.

There are, however, figures available on Goodrich mud and snow tires obtained by the Pittsburgh Testing Laboratory, a national testing organization. One week after NSC completed its tests at Pine Lake, Clintonville, Wisc., Goodrich had the Pittsburgh Testing Laboratory conduct the same tests on the same lake. Only the automobiles were different.

The NSC report states that the average of the mud and snow tires tested stopped in 201 feet from 20 miles an hour on glare ice while conventional tires under the same driving conditions stopped in 209 feet. The Pittsburgh laboratory tests show that Goodrich mud and snow tires required only 132 feet to stop, 69 feet less than the average of mud and snow tires in the NSC tests.

On the ability to stop on hard packed snow, the NSC report showed that conventional tires required 62 feet to stop from 20-miles-an-hour. All mud and snow tires tested needed 54 feet under the same conditions. The Pittsburgh laboratory report revealed that Goodrich mud and snow tires in this particular test stopped in 42 feet.

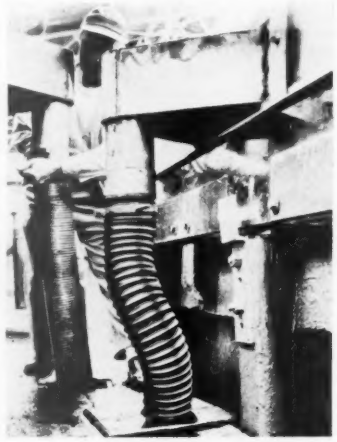
Ability to go, or get away on slippery surface is determined from the traction force developed by the tires. For comparison purposes, conventional tires are given a norm of 100%. On glare ice, the go, or get away average of all mud and snow tires was reported by NSC as 105%, only 5% more than conventional tires. Again the Pittsburgh tests show that Goodrich mud and snow tires outperformed the average of conventional tires as shown in the NSC tests by 250%.

Ability to get away tests on hard packed snow, according to the NSC report, reveal that all mud and snow tires averaged only 24% better than the conventional tires. In the same tests conducted by the Pittsburgh laboratory, Goodrich mud and snow tires were 210% better than the conventional tires as shown by the NSC report, and 160% better than the average of the mud and snow tires tested by the NSC, Goodrich declared.

Can't locate the office copy of RUBBER AGE when you need it? Use the coupon on page 471.

New Use for Flexible Tubing

Flexible Tubing Corp., Guilford, Conn., has announced that flexible tubing made of neoprene-coated cotton duck, supported by a wire helix, is replacing flexible stainless steel hose for handling corrosive vapors at a large Eastern copper refinery. The application is fume removal from electrolytic copper refining tanks. Because of the corrosiveness of the fumes, Type 316 stainless steel is used for hoods and ducts. Formerly Type 316 flexible articulated metal hose was also used for flexible connections. Because of the high military demand for nickel-bearing alloys, Type 316 flexible hose has not been readily available. It was decided to turn to "Spiratube R," made by the Flexible Tubing Corp. The



heavy coating of neoprene makes the tubing highly resistant to attack by the acid fumes. Small breaks can be repaired with a patching kit. The refinery has settled on use of a 5-inch diameter Spiratube R, with a neoprene coating 0.080 inches thick. In service for the past several months, indications are that the tubing will last as long as did the Type 316 stainless steel hose, and will outlast other types of stainless steel hose by at least 100%, the company states. The photograph shows the flexible ducting as it is used to connect removable tank hoods to fume removal ducting in the copper refinery. The tubing in the foreground is neoprene-coated canvas. In the background, an employee is making a connection using flexible metal hose.

No. 555 Stix Adhesive

Adhesive Products Corporation, New York, N. Y., has announced the development of "No. 555 Stix," a new improved adhesive for cementing laminates such as Formica, Consoweld, Resilyte, Micarta, Textolite, Panelyte, etc. No. 555 Stix is said to be the first cement developed which has practically unlimited long time shelf life and does not thicken up or deteriorate during storage. No. 555 Stix makes possible on-the-job installations without the use of heat, pressure or clamps. Laminates such as Formica, Consoweld, Resilyte, Micarta, Textolite, Panelyte, etc., can be adhered to wood, metal, steel and even plaster walls. No. 555 Stix is available in pints, quarts, gallons and drums.

GERMAN REPORTS INDICATE RISING RUBBER PRODUCTION

According to recent reports, West German rubber goods production, which has been rising steadily since the 1948 currency reform, continued to increase during the first half of this year. Sales also were up. Favored by satisfactory supply conditions, the rubber industry was able to turn out 130,000 tons of rubber goods in the first six months of 1953, almost 16% more than in the corresponding period of 1952. Production, however, was slightly lower than in the second half of 1952, when it amounted to 133,000 tons.

Production of tires increased by 8.5% over the first half of last year, but was down 7.2% from the second 1952 half. Because of liberalization the supply of both natural and synthetic rubber has been very good for some time now. Rayon and cotton deliveries have been similarly satisfactory and foreign currency difficulties no longer are an obstacle to rubber imports.

In line with the Allied regulations, production of synthetic rubber in Western Germany has remained constant at 500 tons per month which corresponds roughly to 50% of German synthetic rubber needs. Some companies are now studying plans and cost analyses for stepping up synthetic rubber production, but a decision on this question is not expected until next spring.

The volume of rubber goods sales has increased by about 5% over last year. Owing to price reductions effected last fall and again during the spring, industry earnings have not changed substantially, however.

Celebrates 150th Anniversary

R. D. Wood Co. of Philadelphia, Penna., celebrated its 150th anniversary at a special dinner in that city on November 10. The dinner featured an unusual guest of honor, a half-ton cast iron man of life size height, which was assembled from pipe and fittings brought from the firm's Florence, N. J., plant. In a shining black painted suit, it stood at the dining room entrance with right arm extended and a happy smile to greet the fifty other guests, including officials of the company, and others. A history of the company in book form has been published in observance of the anniversary. It notes that the company was supplying the City of Philadelphia with water pipe in 1816. Pipe dating back to 1822, and still in use, has been noted under Philadelphia streets in recent excavations.

Polymer Industries to Expand

A new plant said to be designed for expanded production and over-all efficiency will be opened formally in early 1954 in Stamford, Conn., by Polymer Industries, Inc. The new plant will consolidate the company's Astoria, L. I., N. Y., and Brooklyn, N. Y., operations, and will enable the firm to increase production by 50%. In addition to the new plant, the company will continue to produce a full line of adhesives and textile chemicals and finishes at its plant in Greenville, S. C.

FIFTH CANADIAN HIGH POLYMER FORUM HELD ON NOVEMBER 19 AND 20

The 5th Canadian High Polymer Forum was held in the Auditorium of the Public Library and Art Museum on November 19 and 20 in London, Ont., Canada, with some 80 members and guests in attendance. The forum included the presentation of 23 papers on all phases of high polymer chemistry, some of which were of direct interest to the rubber industry.

Following the technical sessions on November 19, there was a cocktail hour at which members were guests of the University of Western Ontario at the London Hunt and Country Club. After the reception, the members remained for a dinner and to hear Dr. D. P. Riley of the Royal Institution, London, England, speak on the subject "Structure and Interaction of Biological Macromolecules." The speaker was introduced by Dr. N. S. Grace (Dunlop Tire) and thanked by Dr. R. V. V. Nicholls (McGill University). The chairman, Dr. S. Bywater (National Research Council), moved that a congratulatory telegram be sent to Dr. Hermann Staudinger on his recent award of a Nobel prize, and the greetings of the forum were so extended. (EDITOR'S NOTE: A report on Dr. Staudinger's award appears elsewhere in this issue.)

The technical sessions on November 20 were followed by a business meeting at which the status of the forum was reviewed and the executives for the 6th Forum chosen. Dr. Nicholls was named chairman, Dr. H. Leverne Williams (Polymer Corp.) was named program chairman, and Dr. D. G. Ivey (University of Toronto) was named secretary-treasurer. It was announced that the 6th Forum will be held in some small center early in 1955.

Papers of Direct Interest

As previously stated, some of the papers presented at the 5th Forum were of direct interest to the rubber industry. Among these was a paper on "Application of Theoretical Dilute Solution Viscosity Equations to Commercial High Molecular Weight Copolymers," by R. B. MacFarlane and L. A. McLeod (Polymer Corp.). The authors stated that viscosity measurements of high molecular weight butadiene-styrene copolymers have been made in a Ubbelohde viscometer in toluene and in toluene-isopropanol. From the appropriate plots of the data, k' of the Huggins equation and β of the Mead equations have been evaluated. Both the individual "constants" and their sum have been found to vary above a critical value of the intrinsic viscosity. Certain conditions have been found under which the Mead equation requires a quadratic term in concentration, whereas the Huggins equation is adequate in its usual form.

Another paper of interest presented at the forum was "A Comparison of the Flow of High Polymers in the Cavity of a Mooney Plastometer," by D. S. Fensom (Ridley College). In this paper, reference was made to typical published Mooney time curves for GR-S and Butyl synthetic rubber samples. From idealized curves, the distinctive features of the various parts of flow for the two types of rubber were pointed out and the differences between the types drawn to attention. Assuming that these curves are typical of the two polymers, a tentative explanation was advanced to account for the various sections of the flow curves and to interpret the differences between the curves. This tentative hypothesis of flow in the cavity of the Mooney machine was supported by drawings of actual sample plugs run in the machine and by Mooney time curves for Butyl, GR-S, "cold" rubber, polyisobutylene, polybutadiene, polystyrene and some natural rubber gum stocks.

Two particular features of Mooney time curves were examined in detail in view of this proposed explanation of flow: the time taken to reach the primary peak of the flow curves, and the amount of secondary rise found in certain flow curves after one minute of running. These phenomena may both be sensitive to structural effects such as branching, cross-linking, or entanglement of rubber chains. If this is so, there should be a correlation with the Huggins K' value of with gel content. Evidence was presented to suggest that this is indeed the case.

Discusses Stress Measurement

"Stress - Temperature - Time Studies Through the Second Order Transition Region," by D. G. Ivey (University of Toronto) was also of interest. In this paper the author pointed out that previous measurements of stress in rubber-like materials held at a constant extension have shown strong relaxation effects in the region of the second order transition temperature, but have not been carried to temperatures much below this region. In the work here reported, materials exhibiting a transition at about —30° C. were used, and the measurements carried out in the range from +20° to —80° C. Stress was observed to increase linearly with temperature above the transition, as previously reported.

Surprisingly, linear behavior was also observed below the transition region, the stress increasing with decreasing temperature to quite high values.

It was felt that the intersection of the two straight line curves might be used to define the transition temperature for the process. As strong relaxation effects were observed above this temperature, the apparent transition temperature may be higher, and is dependent on the rate at which the experiment is performed. The experiment indicates that a true transition takes place, but it is masked by relaxation effects, the author observed.

Another Paper by Ivey

Dr. Ivey also presented another paper at the forum, this one entitled "Measurements of the Dynamic Shear Modulus in Solid Polymers at Ultrasonic Frequencies." In this paper, the author pointed out that the relaxation time spectrum of high polymers can be studied by investigating the propagation of elastic waves over wide ranges of frequency. Previous studies on bulk waves at frequencies in the megacycle region have yielded data on the combined bulk and shear moduli. Correlation with low frequency data requires a knowledge of these moduli individually, and therefore a study of the propagation of the highly damped shear waves has been undertaken.

The attenuation is so large that very thin samples must be used, and since the samples must be bonded to an elastic medium, the effect of the interface becomes important. A method was described whereby parallel acoustic delay lines may be used to minimize this difficulty, and preliminary results were reported. Results are in agreement with estimates of the shear modulus made from the bulk wave data on the basis of certain assumptions, he said.

"Contact Angle Measurements on Latex Films and Their Relationship to the Constitution of Latex," by W. Rupar and H. Leverne Williams (Polymer Corp.), was another paper of interest presented at the 5th Forum. In this paper, the authors state that with reference to the Dupre equation $\alpha SA = \alpha SL + \alpha LA \cos\theta$, contact angle readings at the rubber-water interface were measured by the use of an improved contact angle apparatus. Some of the films examined were prepared by the evaporation method from latices of a copolymer of butadiene and acrylonitrile prepared in a low temperature sugar free polymerization recipe. The effect on contact angle readings for a known charge ratio and conversion, was observed when the regular emulsifiers were used in polymerization either separately or together.

From the experiments performed, stability was defined as a function of the contact angles which in turn depended upon the concentration of the protective colloid used. Other factors which could influence the latex structure, such as changes in the polymerization temperature or the addition of an electrolyte to the polymerization were examined.

Three Film Types Examined

Three types of films prepared by (1) evaporation of latex, (2) evaporation of a solution, and (3) rapid freezing of the latex were examined in the contact angle studies. Experiments with different types and concentration of emulsifiers were performed on emulsifier free films prepared from solution. The existence of a partial hysteresis was observed when certain emulsifier drops were placed on emulsifier free films.

Robert Simha (New York University) presented a paper on "The Adsorption of High Polymers." The author observed that adsorption phenomena play a role in a variety of processes involving high polymers, such as chromatography, colloidal stability, and reinforcement. Yet only few experimental results on macromolecules have been reported. Only recently has a theory for rod-like molecules been published. Loosely speaking, no great differences in the affinity of adsorbent and adsorbate between short chains and high polymers have been observed, considering the great differences in molecular weight.

The present paper deals with a theory of monolayer formation from dilute solutions of chain molecules. The significant feature arises from the large number of possible configurations a chain can assume

in the vicinity of the surface. On probability grounds one anticipates that portions of the molecule, trapped by the adsorbent, will be separated by "bridges" extending into the solution.

A calculation based on the statistical properties of coiling molecules shows the total number of adsorbed chain segments to be proportional to $M^{1/2}$ and to increase with increasing chain flexibility. On this basis the thermodynamics of the monolayer can be developed. The resulting adsorption isotherm differs considerably from a Langmuir isotherm in several respects. Experimental results and the effects of molecular weight, solvent and temperature can be analyzed on the basis of this theory, he declared.

"The Mechanism of Depolymerization" by Leo A. Wall (NBS) was still another paper presented at the meeting. It was stated that a general treatment of depolymerization has recently been developed by Simha, Wall and Blatz, which considers this type of reaction as a free radical chain mechanism, analogous to that commonly employed for polymerization, composed of four principal elementary steps: initiation, (de)propagation, transfer, and termination. As a result of this treatment, one can correlate the products of depolymerization, and the variation in molecular weight of the residue with the rate.

Discusses Polymer Differences

The differences between various polymers are attributed chiefly to differences in the probability of the transfer step which depend upon the structure of the polymer. In order to establish the nature of this transfer process and to separate it from effects conceivably due to "weak links," studies were carried ont on α and β deuterostyrene polymers and on polymethylene.

The results indicate that the transfer process is an inter-molecular reaction and that "weak links" do not account for the behavior observed. In addition, the role of branching in polyethylene decomposition becomes evident in the light of the studies on polymethylene. The polymethylene rate and molecular weight behavior versus decomposition is shown to fit almost perfectly the theory for a random degradation reaction. In the studies on deuterated polystyrenes there is evidence for isotope effects both on the transfer and (de)propagation reaction.

Samuel H. Maron and Richard L. H. Lou (Case Institute) also presented a paper at the 5th Forum, this one entitled "Light Scattering Studies in Pure Liquids and Polymer Solutions." The authors explained that a simple method has been developed for calibration of light scattering photometers in absolute turbidity units by use of due Pont "Ludox" colloidal silica dispersions. The method relates directly the turbidities of these dispersions as obtained by transmission with their 90° scattering.

Employing this calibration method, the absolute Rayleigh scattering has been determined for benzene, carbon tetrachloride, toluene, and methyl ethyl ketone at 4358 and 5461A°. The results obtained are in good agreement with those published by Zimm, Doty, Brice and their co-workers, as well as with the predictions of the Einstein equation for the scattering of pure liquids.

Molecular weight determinations at 4358 and 5461A° run on the Cornell standard polystyrene in toluene and methyl ethyl ketone, and on the International Union of Chemistry polystyrene Sample III in the latter solvent, also show excellent internal consistency as well as good agreement with published data, it was stated.

Chair Tips for Safety Use

James J. Davidson, president of the Dural Rubber Co., makes the interesting suggestion that ordinary rubber chair tips be affixed to projecting parts such as rods, poles and sharp edges in machine shops and elsewhere. Used on machines in this way, the rubber tips will prevent scratches, abrasions and torn clothing, and reduce trips to the first aid kit.

Fluid Rubber Compositions

In the Autumn issue of "Rubber Developments," quarterly publication of the Natural Rubber Bureau, 1631 K St., N.W., Washington 6, D. C., there is an article providing information on several new developments in fluid rubber compositions. The piece points out that fluid rubber compositions contain neither water nor volatile solvent; that they can be poured and set to form elastic, soft rubber or hard rubber articles, and that they use as their starting point a highly broken-down rubber known as "Rubbone." The author, an associate of Rubber Technical Developments, Ltd., then goes on to describe just how Rubbone is prepared, and to develop various applications of fluid rubber compositions. Among these are printers' rollers for which he details two compounds developed specifically for rollers together with the time of vulcanization required at three temperatures. Detailed compounds are also given in connection with the use of fluid rubber compositions for the manufacture of molds, in which alabastine and synthetic resins are to be cast; for uses where it is advisable not to stain silver; for sealing compounds; for uses where calcium silicate is used as a filler; and for uses involving hard rubbers.

McClure Joins Cabot Research

The Plasticizer Division of Godfrey L. Cabot, Inc., Boston, Mass., has announced that Peter R. McClure has joined the staff of the company's Research and Technical Service Laboratories in Cambridge, Mass. Mr. McClure will be engaged in the solution of specific customer technical problems. Since receiving his B. S. degree in chemistry, cum laude, in 1944, Mr. McClure has been actively engaged in the plastics industry, with particular emphasis on vinyl compounding and processing. He is a member of the Society of Plastics Engineers and Society of Plastics Industries.

QM RUBBER HEEL AND SOLE IAC HOLDS MEETING IN WASHINGTON

The second meeting of the Quartermaster Corps Industry Advisory Committee on Rubber Heels and Soles met in the Office of the Quartermaster General on Tuesday, November 10, 1953. The government presiding officer was Dr. Stephen J. Kennedy, research director for textiles, clothing and footwear. Dr. Kennedy welcomed the committee members from industry and presented the purpose of the meeting which was to consider the subject of traction soles and heels in order to provide the wearers with maximum stability and functional performance on service and combat footwear.

The first item discussed, as stated on the agenda, concerned the views of the members of the committee as to the merits of 11 suggested cleated sole designs and a determination of which of these were worthy of further study. As a result of this discussion, four designs were selected from those submitted and two additional ones discussed in the meeting were added to this group. It was felt that all of the selected designs will need at least some minor modifications and the members agreed to further study them from this standpoint.

Test Sample Preparation

The second principal subject brought forth in the meeting concerned the recommendations of the members with reference to the preparation of test samples and plan of tests. On account of the great amount of detail involved in providing working drawings, patterns and molds in order to produce some of the soles in experimental designs, it was felt that it would be best to contract with various rubber sole manufacturers to produce required quantities of soles in necessary sizes.

In the ensuing discussion the matter of hardness and abrasion indexes of the present rubber soles were mentioned and the committee members agreed and recommended that experimental cleated soles should be made of a somewhat softer compound than at present, but with an increase in the abrasion index. It was also agreed that the ultimate goal is to have cleated heels and soles with maximum durability coupled with non-marking qualities, to prevent unsightly marks on floors. It was further agreed that personnel in both OQMG and industry should accelerate their work toward the practical realization of this non-marking quality.

AMA Issues "Motor Truck Facts"

The Automobile Manufacturers Association, Detroit, Mich., has issued a new edition of "Motor Truck Facts," companion book to "Automobile Facts and Figures." Formerly a biennial publication, "Motor Truck Facts" will now be issued yearly. More than 50 pages of charts and tables in this year's edition tell the story of truck transportation's rapidly growing influence in the U. S. economy. The book traces U. S. truck production from the year 1904 and offers complete statistical data on all phases of the trucking industry.

Bio-Rad Analytical Resins

Ion exchange resins pre-processed to make them suitable for chemical, medical and physical laboratory applications are now available from the Bio-Rad Laboratories, 800 Delaware St., Berkeley 9, Calif. "Dowex" starting material, supplied by the Dow Chemical Co., is being more completely sized; purified by alternate acid, base, and organic-solvent cycles; and defined—by an individual analysis on each batch—covering moisture content, cross linkage, capacity, size distribution, and porosity. Designed to provide a source of pure ready-to-use resins with known properties, this new grade of material will permit standardized, reproducible procedures to be carried on even at different locations, since the resin will be eliminated as an experimental variable.

Resins presently available from stock, with various size distributions and cross linkages include four types processed from Dowex 50 (cation exchange), Dowex 1, 2, and 3 (anion exchange). These are extremely stable styrene type resins with capacities ranging from 5.2 milliequivalents per dry gram for Dowex 50 to 3.0 milliequivalents per gram for Dowex 2 starting materials. Resins with special cross linkages, special sizes, and very narrow size distributions will be made available as required.

Goodyear Offers Testimony

Information given to a special subcommittee of the Senate Interstate and Foreign Commerce Committee last July 16 to Harry J. Carroll, veteran traffic manager of the Goodyear Tire & Rubber Co., indicated that Goodyear, as far as possible, tries to use American ships for its imports and exports but can't find them available more than a third of the time. Mr. Carroll told the subcommittee that last year, Goodyear imported approximately 110,000 tons of crude rubber and latex. "It is our policy to put all of our finished products on American flag ships, and also our imports. However, I find that over a period of time about the best we can do is a maximum of 33⅓%, but it is usually around 25%, due to American ships not being available at the time we ship. . . . available when we have the products ready We have to take advantage of the sailings to move," he declared.

TMTD Now Available

J. M. Baird Co., New York, N. Y., manufacturers, importers, and exporters of chemicals, has announced the availability of continuous supplies of TMTD (tetramethylthiuram disulfide). TMTD is used in natural rubber compounding as a primary and secondary accelerator. It is especially good as an accelerator for rubber articles which have to be odorless, tasteless and non-toxic, the firm states. TMTD, Type 714, imported by Baird, is produced by Chemische Fabriek Aagrunol, Groningen, Netherlands, one of Europe's well known chemical works, who have been supplying most European makers of rubber products. Prompt delivery is made from local stocks.

Marbon Promotes Shattuck

Robert Shattuck

Promotion of Robert Shattuck to the presidency of the Marbon Corp., Gary, Ind., subsidiary of Borg-Warner, was recently announced. Mr. Shattuck previously was vice-president and general manager of Marbon. As president he succeeds George P. F. Smith, whose retirement from this post will permit him to devote full time to his duties as president of the Norge Division of Borg-Warner. H. Hunter Gehlbach, assistant secretary and assistant general counsel of Borg-Warner, has been elected secretary of the Marbon Corp. E. R. Meyer, previously chief accountant, now becomes Marbon's treasurer and assistant secretary. D. Morris Pratt has been re-elected vice-president and sales manager. Mr. Shattuck joined Marbon in 1942 as assistant general manager and was named vice-president and general manager in 1944. He formerly was assistant production manager of U. S. Gypsum Co. in Chicago. A native of Clinton, Ind., he was graduated in chemical engineering from Rose Polytechnic Institute, Terre Haute, Ind.

Rubber-Cushioned Freight Cars

Ten rubber-cushioned freight cars have been purchased by the Erie Railroad at a cost of $76,500 for use in a continuing search for ways to reduce possible damage to shipment, according to a recent announcement. The ten experimental cars will be used in regular freight service, but their loads will be restricted to commodities which are more susceptible to damage in transit, the company explained. The cars have rubber-cushioned underframes. The rubber cushion supplements the standard draft gear for absorbing the impact effect in train and yard handling of freight cars.

DPR Synthetic N-27

DPR, Inc., Belleville, N. J., has introduced "DPR Synthetic N-27," a liquid copolymer of butadiene and acrylonitrile (27%) which finds use in the plasticizing or modifying of plastics and synthetic resins. Light amber in color, the material has a weight of 8.1 pounds per gallon and a viscosity of 130,000 cps at 25°C. Its specific gravity at 25°C. is .97 while its iodine number is 140.1. It has a molecular weight of 1,500 to 2,000.

Solarite Resin No. 11

Solar Compounds Corp., Linden, N. J., has introduced "Solarite No. 11," a new synthetic rubber processing resin which is non-saponifiable and resistant to alkalies, acids and water. It has high compatibility with natural rubber, GR-S, Butyl, neoprene and other synthetics. Although it is a synthetic hydrocarbon resin, one of the most interesting properties of Solarite Resin No. 11 is its close structural similarity to natural rubber. This similarity has been investigated through infrared spectrophotometer measurements and the transmission curves for the product are said to be in essential agreement with those for natural rubber. The product features easier incorporation, dispersion and processing without "mushiness"; maintenance of flexing characteristics despite severe aging or exposure to ozone; suitability to pure gum or highly loaded stocks; and excellent electrical characteristics. In addition, stocks processed with Solarite Resin No. 11 possess marked freedom from scorching and bin curing, and maintain viscosity over extreme temperature variations. The product comes in lumps and is very friable, is amber in color and has an estimated molecular weight of 630 and a specific gravity of 1.01 to 1.02.

Plan Materials Handling Show

The Society of Industrial Packaging and Materials Handling Engineers has launched plans for the 1954 Ninth Annual Industrial Packaging and Materials Handling Exposition, Competition and Short Course. They will be held at the Coliseum in Chicago, Ill., the exposition and the competition on September 28 to 30, and the Short Course from September 27 to 30. C. J. Carney, Jr., managing director of the organization and its yearly events, said that an eminent institution of higher learning again will conduct the 1954 Short Course. The Massachusetts Institute of Technology, the University of Illinois, Wayne University, Temple University and the Case Institute of Technology have directed previous short courses.

"Nyb-Ray" Conveyor Belt

A rayon carcass conveyor belt that is sturdy but lighter than cotton-duck belts has been added to the line of the New York Belting and Packing Co., Passaic, N. J. Called "Nyb-Ray," the new belt will perform equivalent load carrying capacities of higher-priced cotton carcass construction, the company states. The rayon belt, according to the company, has good troughability, flex life, tear resistance and fastener-holding ability. It is also said to have a lower stretch factor than cotton duck.

Plated Moulds Announces Move

Plated Moulds, Inc., formerly located at 20 East 16th St., New York, N. Y., has moved to 972 Nepperhan Ave., Yonkers, N. Y. The new telephone number is Yonkers 8-3538. The company has doubled its capacity at its new address, and now produces all types of copper electroformed molds for slush molding including a bright, internally plated type for boots.

Sun Opens Petrochemical Plant

At a special press conference and plant tour on December 2, the Sun Oil Co., Philadelphia, Penna., unveiled its new $15,000,000 plant for the production of petrochemicals which has been added to the company's already large refinery at Marcus Hook, Penna. Part of the new plant is now in operation, and the remainder will be on stream before the end of the year. The new plant is designed to produce annually as much as 19,000,000 gallons of benzene, the same quantity of toluene and 15,000,000 gallons of mixed xylenes. Production of these basic aromatic chemicals from this one plant will equal one-fourth of their total production by the entire coal tar industry in 1941—the last year in which the U. S. had to rely exclusively on coal tars for many chemicals now made from petroleum. A new catalytic reforming process called Houdriforming, developed by the Houdry Process Corp., was adapted with the help of Sun engineers to the manufacture of aromatics. It forms the main part of Sun's new petrochemical plant. The purification step is largely handled by a Dow Chemical Co.-Universal Oil Products Co. process which is licensed by the latter company. The new plant is a major step in a series Sun Oil has taken in the petrochemical field. Sun Oil is already a major producer of propylene trimer and tetramer. The company also manufactures sulfonates and a new type of naphthenic acid—high molecular weight and practically free of oil.

"Wire Grip" Truck Tire

A heavy-duty express truck tire with over 5,000 steel claws in a new type tread, has been announced by the B. F. Goodrich Co. The sharp steel claws, about 80 per inch of tread width, dig in like the spikes in track shoes to give extra road-gripping action to cut through ice and snow in winter. It also affords sure-footed traction on roads made slick by rain and road film in summer. The tire is said to assure straight-line stops and faster starts. The specially engineered "zig-zag" design of the steel wire used in the "Wire Grip Heavy Duty Express" binds itself permanently into the four outer tread ribs of the tire during the molding process. The wire grip tread lasts almost the life of the original tread. The cord body can be recapped, either with new wire-type tread, or with a standard all-rubber tread. Goodrich is currently making wire grip truck tires in three sizes, 8.25-20, 10.00-20, and 10.00-22.

Chamberlain Acquires Dobbins

Chamberlain Corp. of Waterloo, Iowa, has acquired control of Dobbins Manufacturing Co., an Elkhart, Ind., maker of agricultural spraying and dusting equipment. George R. Keltie, president of American Wringer Co., the parent concern of Chamberlain, reported Thomas G. Cassidy of Chicago was associated with the controlling purchaser, and that Nicholas L. Etten, president of Chamberlain, has become president of Dobbins. Last August, control of American Wringer was acquired by Ambrook Industries, Inc.

FINANCIAL NEWS

Dewey & Almy Chemical Co.

Nine Months to September 30: Net profit of $1,256,116, which is equal to $1.37 a share, compared with $230,730, or 25c a share, in the first nine months of the preceding year. Net sales in the first nine months of 1953 totaled $25,761,527, against $20,597,899 in the first nine months of 1952. Income of 1952 included a tax credit of $508,000.

Union Asbestos & Rubber Co.

Nine Months to September 30: Net profit of $148,415, which is equal to 31c a share, compared with $471,583, or 99c a share, in the comparable period of the preceding year. Net sales in the first nine months of 1953 amounted to $8,490,422, against $10,262,323 in the first nine months of 1952.

Columbian Carbon Co.

Nine Months to September 30: Net income of $3,376,537, which is equal to $2.09 a share, compared with $2,906,655, or $1.80 a share, in the comparable period of the prior year. Sales in the first nine months of this year amounted to $39,420,807, compared with $34,608,379 in the first nine months of 1952.

Goodall Rubber Co.

Nine Months to September 30: Estimated net income of $166,468, which is equal to $1.38 each on 116,552 shares, compared with $165,276, or $1.43 each on 111,086 shares, in the comparable period of 1952. Net sales in the 1953 period were $6,456,021, against $6,643,548 in the 1952 period.

Hewitt-Robins Inc.

Nine Months Ended September 30: Net income of $865,354, which is equal to $3.01 a share, compared with $668,377, or $2.34 a share, in the corresponding period of 1952. Net sales for the first nine months of 1953 amounted to $28,629,816, contrasted with $27,583,166 in the first nine months of 1952.

National Motor Bearing Co.

Nine Months to September 30: Net income of $632,819, which is equal to $1.49 a share, compared with $582,275, or $1.37 a share, in the corresponding period of 1952. Sales for the 1953 period were $14,126,330, contrasted with $12,698,391 in the first nine months of 1952.

Raybestos-Manhattan, Inc.

Nine Months to September 30: Net income of $2,402,821, which is equal to $3.82 a share, compared with $2,131,273, or $3.39 a share, in the first nine months of 1952.

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Smog Protectant For Tires

Use of a new material in tires to protect them from being attacked by smog, chemical fumes and smoke has been announced by the Firestone Tire & Rubber Co. The new material is mixed with rubber and other chemicals and, after the tire is put into use, continually provides a film-like coating over the sidewall and other parts of the tire. All Firestone passenger car tires are being manufactured with the new material so motorists in every part of the country will receive the same protection from the deteriorating effects of smoke, chemical fumes and smog on tires.

After a study of tire performance in the Los Angeles area and the publishing of a series of technical reports (prepared by Dr. C. E. Bradley and Dr. A. J. Haagensmit of the California Institute of Technology) on the effects of smog on tires, Firestone attempted to solve this problem. For more than a year, engineers experimented with tires on test cars that were operated 24 hours a day in the area. These exhaustive tests led to the discovery of a specially compounded rubber by the company's technical experts. Upon discovery of the material and the process that would give tires extra protection from deterioration or weather checking and cracking, Firestone adopted the new formula in the construction of all of its passenger car tires.

Hewitt-Robins Appointments

Appointment of three new assistant controllers was announced recently by Hewitt-Robins Inc., Stamford, Conn. The new appointments are as follows: Austin Franklin, in charge of all accounting matters of the Rubber, Conveyors and Engineers Divisions as well as the Korb-Pettit subsidiary; Howard Stoughton, responsible for all accounting and financial matters relating to the International Division, also responsible for certain corporate financial matters; R. B. Lape, responsible for all accounting matters pertaining to the Foam Rubber Division. It was also announced that E. P. Meyer has been named controller of the company's foam rubber plant in Buffalo, responsible to Mr. Lape; and E. G. Shuttleworth has been appointed controller of the industrial rubber products plant in Buffalo, responsible to Mr. Franklin.

Introduces New Activator

Experimental quantities of phenylcyclohexyl hydroperoxide, which is said to have shown excellent results as an activator for cold GR-S formulations, are available from the Phosphate Division of the Monsanto Chemical Co., St. Louis, Mo. The new product, a yellowish liquid containing 20% of the hydroperoxide, also may be good as a polymerization catalyst for other applications such as styrenated polyesters. Recent tests have produced polymerization recipes for preparation of cold GR-S in less than 20 minutes at 41° F., many times faster than ordinary processes. A very active organic hydroperoxide, the substance is a 20% solution of phenylcyclohexane hydroperoxide in phenylcyclohexane. The formula is $C_6H_5.OOH.C_6H_{10}$.

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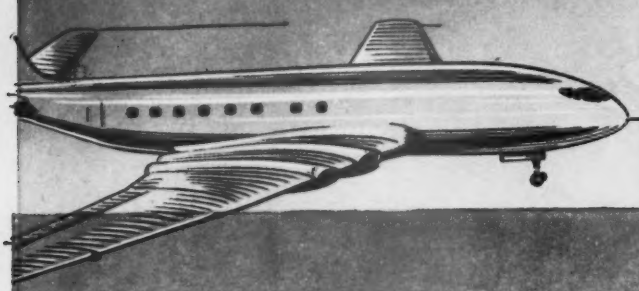

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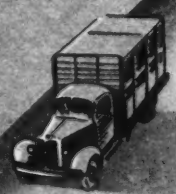

Shaw-McNeil 40-34-3½ Twin Bag-o-matic Curing Press for Cycle Tyres. Supplied complete with motor and controller time cycle controller—ready for connection to service lines

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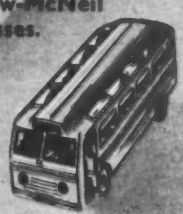

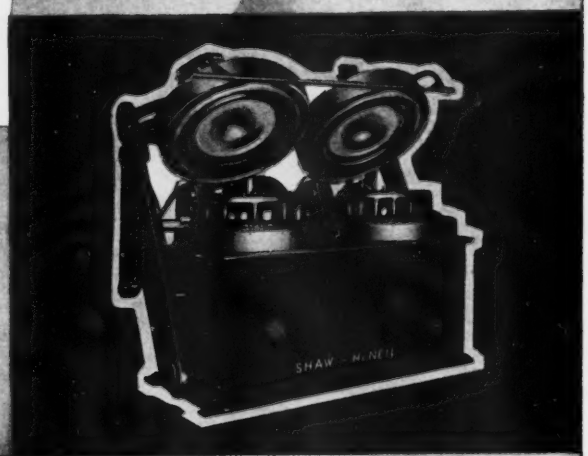

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NAMES IN THE NEWS

CARLTON ELLIS, JR., has been appointed director of sales for all Plaskon products according to the Barrett Division of the Allied Chemical & Dye Corp.

LEON W. SEIGLE and FRED B. JOHNSON have been appointed manager and assistant manager, respectively, of Intermediate Sales, National Aniline Division, Allied Chemical & Dye Corp.

A. F. DANTINO, associated with Hewitt-Robins Inc. for the past fifteen years, has been appointed production manager of the company's industrial rubber products plant at Buffalo, N. Y. HAROLD STOCKMAN, with the company for the past twenty-nine years, has been named production superintendent of the Buffalo plant.

C. A. AMMANN, government sales representative for the Goodyear Tire & Rubber Co. at Washington, D. C., was recently awarded a service pin by the company marking his completion of 40 years' service.

FRANKLIN FARREL, III, executive vice-president of the Farrel-Birmingham Co., was recently awarded a 20-year service pin by the company.

CHARLES R. SNYDER, formerly assistant secretary and comptroller of the Wooster Rubber Co., has been named assistant general sales manager of the company.

IRVIN J. SJOTHUN, who has been on loan to the Office of Synthetic Rubber as chief of its tire testing branch for the past two years, has returned to the Firestone Tire & Rubber Co. at Akron.

SIDNEY A. PARADEE has been named Chicago district representative of the Chemical Products Division of the Archer-Daniels-Midland Co., with headquarters at 927 Blackhawk Ave., Chicago 22, Ill.

R. LOUIS ROUGEMONT, formerly chief engineer with the Reed-Prentice Co. of Worcester, Mass., has joined the Jackson and Church Co. of Saginaw, Mich., as consulting engineer for the Plastics Division.

KENNETH L. WAY, formerly manager of hose sales and development for Hewitt-Robins Inc., has been named assistant manager of sales operations. HARRY KNECHTEL, associated with the company, since 1940, has been named manager of hose sales and development succeeding Mr. Way.

RUSSELL FORBES, formerly Deputy Administrator of General Services, has been named chief consultant of the Surplus Property Use and Disposal Task Force of the Hoover Commission.

CECIL W. HUMPHREYS, formerly general manager and manager of Development for the Manufacturing Department of the Shell Chemical Corp., has been appointed vice-president in charge of manufacturing for the corporation.

J. R. MOORE, president of the Harwick Standard Chemical Co., has been elected a director of the Pennsylvania Industrial Chemical Corp.

ADELBERT H. LOUX, associated with the Flexible Tubing Corp., Guilford, Conn., since 1949, has been named general sales manager.

DR. SAMUEL J. NELSON, formerly associated with the U. S. Rubber Co. and the Atlantic Refining Co., has joined the Resins and Plastics Group, Research and Development Department, Hooker Electrochemical Co.

KENNETH KASHDAN has joined the sales staff of Polymer Industries, Inc., to service the Middle Atlantic states.

LEONARD D. FRESCOLN has joined the Minnesota Rubber and Gasket Co. as a sales representative in the Denver, Colo., area.

E. N. CUNNINGHAM, formerly assistant sales manager of the Precision Rubber Products Corp., has been promoted to sales manager.

GEORGE COHEN, formerly associated with the Naval Research Laboratory as a chemist, has joined the staff of the Frederick S. Bacon Laboratories as an organic chemist.

WILLIAM R. BEARDSLEY, previously a vice-president of the Colorado Interstate Gas Co., has been named vice-president of the United Producing Co., Inc., a subsidiary of the United Carbon Co.

K. A. SEARLES, associated with the Goodyear Tire & Rubber Co. since 1944, has been named technical service representative for Pliobond.

WILLIAM A. KARL, president of Firestone Textiles, has been named a member of the board of trustees of the Textile Research Institute.

RICHARD L. LYNCH, formerly sales manager of the R-B-H Dispersions Division of the Interchemical Corp., has been appointed division vice-president.

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Peterson To Assume Presidency

Chester H. Peterson

Chester H. Peterson, currently executive vice-president of the U. S. Rubber Reclaiming Co. of Buffalo, N. Y., will become president of the firm January 1, 1954, it was announced recently by Milton Dammann, chairman of the board. Mr. Peterson will succeed Jean H. Nesbit, president of the company since 1942, who on January 1 will become chairman of the Executive Committee. Mr. Peterson came to U. S. Rubber Reclaiming in 1950 as vice-president in charge of production. He played an active role in the development and production of the company's new powdered rubber, "Flo-Mix," which went on the market this fall. He took his present position of executive vice-president in August, 1952. Mr. Peterson is a graduate of the University of Wisconsin. Before coming to U. S. Rubber Reclaiming, he was associated with the Firestone Tire & Rubber Co., the Ford Motor Co., the Pennsylvania Rubber Co. and the General Tire & Rubber Co.

HB-20 Vinyl Plasticizer

Availability of a new low-cost, extender-type plasticizer for vinyls has been announced by the Phosphate Division of the Monsanto Chemical Co. The new material, with a trade name of "HB-20," is a partially hydrogenated alkyl-aryl hydrocarbon. A water white, high boiling, and practically odorless liquid, the material also shows promise for use as a plasticizer for polystyrenes, ethyl cellulose, and asphaltic compositions. Application research indicates that HB-20, due to a cost lower than several similar products, will have the best acceptance in pigmented and colored vinyls. Preliminary tests have shown HB-20 to be practically non-toxic from an acute point of view. Principal physical properties of HB-20 include: color, less than 100 APHA; specific gravity, 0.971 ± 0.003 at 25/15.5° C.; pounds per gallon, 8.08 (average); refractive index, 1.5470 at 25° C.; viscosity, 55.7 SUS at 100° F.; pour point, minus 54° C.; flash point, 160° C.; flame point, 182° C.; aniline point, minus 15° C.; distillation range, first drop —312° C.—(594° F.), 95 per cent—370° C. —(698° F.).

BRPRA REPORTS ON TECHNOLOGICAL ADVANCES MADE DURING 1952

A report covering its technical activities during 1952 has been issued by the British Rubber Producers' Research Association, Inc., which maintains headquarters at 19 Fenchurch St., London E.C. 3, England. This review of the year's work covers that of both the BRPRA and Rubber Technical Developments, Ltd. The report states that no completely logical separation between the activities of these two bodies is possible, because on many projects they work in close cooperation.

The report states that the most striking progress during the last year has been made in the development of cyclized rubber. Following the successful pilot plant operation of this material by RTD at the end of 1951, the process has been modified to meet conditions in the East and a pilot plant was shipped from RTD and installed at the experiment station of the Rubber Research Institute of Malaya. It was anticipated that commercial production of this material would start during 1953.

Good progress has been made in the initial stages of developing other materials, whose properties are intermediate between those of soft rubbers and hard plastics. The general process involves polymerization of such substances as styrene or methyl methacrylate in latex.

A study of the physics of tearing of rubber, commenced in previous years, has made excellent progress, and has led to a first tentative explanation of differences in the tear resistance found among rubbers. RTD has made an important advance in the technology of fluid rubber compositions. These permit the production of either soft or hard rubber articles by pouring a fluid form of rubber into a simple mold.

Other Major Achievements

The report states that the process of vulcanization by means of peroxides has been further developed. Early products made in this way were mechanically weak, but substantial improvements have now been achieved. Studies of the fundamental chemistry of the vulcanization of rubber by sulfur have been carried much further. Earlier ideas have been shown to be inadequate, and there are now good prospects of understanding and controlling the chemical structures produced by vulcanization.

Both the breakdown of raw rubber during mastication, and the deterioration of properties of a vulcanized rubber article during aging, depend to a considerable extent on the effects of atmospheric oxygen. Recent work has shown, the report states, that ideas now generally current about these processes were much too simple, and has brought a fuller explanation in sight. Some unexpected conclusions about the structure of raw rubber have emerged from this work.

The report also notes that a study of the factors responsible for the stability of latex has led to the isolation—in collaboration with RRI—of a pure protein. RTD has also made further advances in the application of "Positex". There appears to be no reason why this treatment should not be used commercially on an increasing scale during 1953, the report said.

Another important development is the use of latex in the production of unwoven bonded fiber fabrics. RTD has made these on a fairly large scale, and an immediate industrial outlet is apparent. RTD also successfully completed technical work on the production of vapor-permeable proofed fabrics, the results of which were published in *Rubber Developments*.

Advances in Fundamental Chemistry

The fundamental chemistry group is numerically the largest in the BRPRA organization. Teams of organic and physical chemists were directed toward the two problems of the chemical reactions involved in vulcanization and aging. The report states that it is generally agreed that the essential purpose of vulcanization is to provide cross-links between the rubber chains, which serve to convert the plastic masticated rubber compound into an elastic resilient vulcanizate. The nature of these cross-links is much less certainly established, and an important part of the work carried out during the last year has been to apply crucial tests to some of the hypotheses previously advanced.

While many details remain to be filled in, a number of alternatives can now be dismissed, and it is quite certain that the nature of the cross-links depends on the precise way in which the vulcanization is carried out. It is through such differences as these that the properties of the vulcanizate are determined, and it is by exploiting such differences that the properties which determine the value of the product are ultimately controlled.

Much of the earlier work on the degradation and plasticization of rubber has been based on the assumption that oxidation is the essential key both to the plasticization of raw rubber and to the aging of either raw or vulcanized rubber. Work carried out during 1951 showed that this was only partly true, and work during 1952 has brought to light other evidence of the complexity of these processes.

New discoveries have been made about the breakdown of rubber in solution in the absence of oxygen; these are quite novel and unexpected, the reports states, and seem to point to the existence of weak points in the structure of rubber as it is obtained from the tree. Taken together with work in progress at RRI, these findings show that natural rubber is structurally more complex than had been thought. The relevance of such findings to the processibility of rubber will require careful consideration, according to the report.

Studies on Oxidation

Work on the oxidation of vulcanized rubbers has proceeded in the closest possible liaison with work on sulfur vulcanization. The two together form an exceedingly complex and practically virgin field of organic chemistry, in which, however, excellent progress is now being made.

It is noted in the report that some problems which are not readily solved in any other way can, in principle, be resolved by making use of radioactive isotopes which are now available. For this reason, a laboratory has been equipped for radiochemical work, and investigations have been commenced in which radioactive sulfur has been employed. If one of the participants in a reaction is a sulfur-containing body in which a part of the sulfur is radioactive, it is quite easy to follow its subsequent fate during the reaction, by measurements of radioactivity. This is a powerful tool in appropriate circumstances, and has already been put to good use during the few months that the laboratory has been at work.

The work of the whole group has continued to derive essential support from its analytical sections. One of these is concerned with micro-chemical methods, which determine the ultimate composition of a compound. The other is concerned with spectroscopic investigations in which the infra-red and ultra-violet absorption spectra are used to characterize the particular chemical groupings present in a compound.

Developments in Applied Chemistry

During the past year, the applied chemistry group has been especially active in studying the chemical modification of rubber. The general problem here, says the report, is to explore methods by which natural rubber can be chemically modified, and to submit samples of products obtained to other groups for evaluation.

As mentioned previously, work on cyclized rubber has been transferred to the Far East. Various modifications of the cyclization process were investigated so as to render it more suitable for use in fresh latex. In the course of this work, a new class of stabilizer was adopted, a step which will lead to significant economies in the process, the report states. This class of stabilizer has not hitherto been available in Great Britain, but arrangements for its manufacture to meet anticipated demand were made.

Much time and effort has been devoted to the study of polymerization of styrene, methyl methacrylate and other related materials, in conjunction with latex. This project has involved several types of investigations. It was felt necessary to supplement the purely preparative work with a more fundamental investigation of the nature of the processes occurring and of the structures of the products obtained.

This fundamental work has given interesting results, which are considered likely to have important practical repercussions. The extent to which the rubber is chemically attacked has been found to be markedly dependent on the type of catalyst used, so that a range of different materials can be made from the same reactants. These are termed generically "graft polymers", indicating that one or more polymers have been "grafted" on to the rubber molecule. This work, states the report, challenges synthetic rubbers on their own ground, since polymerization is the basic process by which they are made.

The investigation of the nature of "graft polymers" is typical of a more general problem which may be termed "polymer characterization." Its broad aim is to study the shape and size of the molecules of rubber and its derivatives. A special section for this work has been in operation for some time, but at the beginning of 1952 it was felt desirable to transfer to Malaya

that part of its activities concerned with unmodified rubber. The leader of the section has now established a laboratory there in which he can study the properties of freshly tapped rubber.

Activities of Physics Group

The activities of the physics group were somewhat limited during the year due to staff depletions. Some advances, however, were made during 1952. During the last few years a substantial body of mathematical theory has been built up which, in principle, enables the calculation as to how a rubber article will deform under a given set of forces. The practical application of this theory to engineering problems frequently encounters such serious mathematical difficulties that only approximate or numerical solutions are possible. Most of the problems capable of exact solution have now been worked out; experimental verification has confirmed the mathematical conclusions, and further increased confidence in the correctness of the general analysis.

Investigations during the last two years have thrown much light on the conditions necessary for the initiation and growth of a tear in a piece of deformed rubber. An important practical problem arises when the deformation is not constant, but changes regularly or irregularly as the load undergoes rapid change. For this reason, attention has been given during 1952 to the growth of a cut when subjected to a repeated cycle of loading. Important progress has been made in the understanding of this process, in relation to ideas previously developed on the growth of a tear under the influence of a steady load.

Laboratory studies have also been carried out designed to provide a better understanding of both the visco-elastic properties of rubber-bitumen mixtures and the mechanical properties of mixtures containing aggregate. These have proved of value in planning the full-scale road trials carried out in the latter part of 1952.

New Applications of Latex

The main long-term scientific project of the latex group is the elucidation of factors which determine the stability of rubber latex. During 1952, cooperation between the latex group and RRI has led to important and substantial advances. Methods of analysis and fractionation of protein have been worked out, using materials supplied by RRI. It has been shown that at least five different protein constituents are present, and one of them has been isolated in a reasonably pure state. This forms some 40% of the total protein, and it is believed that it is the precipitation of this component which largely accounts for the normal coagulation of fresh latex by acids.

Much work has already been done by earlier workers on the stability of latex compounded with zinc oxide. A number of theories have been propounded, but work carried out by the latex group during 1952 seems to show that none of these is completely satisfactory. A modified hypothesis has been put forward which appears to be supported by both the known facts regarding zinc oxide stability and by the results of ancillary experiments.

Reference was made in the 1951 report to the development of a series of non-ionic heat sensitizing agents. This work has continued in cooperation with Messrs. Oxirane Ltd., who have now prepared and distributed bulk samples of an agent which appears suitable for the production of foam rubber articles. If response from manufacturers is encouraging, the report declares, the company is in a position to supply any reasonable demand immediately. Meantime, modified agents are under examination, both by the latex group and by RTD for use in making dipped and molded articles.

One member of the latex group has worked during 1952 in the laboratories of the British Leather Manufacturers' Research Association, where he has developed a method of impregnating leather with rubber by drumming the leather in presence of dilute latex. Conditions have been established in which a substantial penetration occurs into the body of a chrome-tanned calf skin (such as is used for shoe uppers). Large scale trials have been put in hand, and a decision as to the usefulness, or otherwise, of this process is expected during 1953.

Technological Progress

The broad aim of the technological group is to translate into technological practice new ideas emerging from the fundamental researches of the other groups. During the past year, work was done on the rubber-methyl methacrylate "graft polymer." It was discovered that some physical properties of a vulcanizate prepared from such a material are profoundly influenced by mastication of the raw polymer, the effects being of considerably greater magnitude and opposite in direction to those exhibited by a normal rubber compound. Similar effects have been found with "graft polymers" of rubber and other constituents.

A trial was arranged in which giant truck tires were made from one of the modified rubbers. The trial, while successful to a point, emphasized the need for certain modifications, and has led to an extended research by the applied chemistry group. This type of cooperation is essential to the development of new materials, the report emphasizes.

The general evaluation of "graft polymers" has shown that those based on methyl methacrylate and styrene, when compounded to give vulcanizates having a hardness similar to that of a carbon black-reinforced rubber, have a very good level of physical properties. Tensile strengths are particularly good and the rubbers show little deterioration on heat aging. Perhaps the most striking fact as yet discovered is that the resistance to flex cracking of the methyl methacrylate "graft polymer" far exceeds that of a comparable carbon black compound.

The physical testing group has worked on the development of new methods for testing during 1952, and has also been instrumental in organizing international exchanges. It is well known that different laboratories frequently find difficulty in obtaining concordant test results, and this matter clearly assumes considerable importance in such a scheme as the technical classification of natural rubber supplies. The technological group has made most valuable contributions toward raising the general standard of physical testing.

Reference has already been made to the work of the physics group in the computation of the elastic properties of engineering units such as mounting bushes. The work of the technological group has been mainly concerned with departures from ideally elastic behavior, as represented by hysteresis losses, creep and fatigue; their work has been mainly in the realm of measurement, and has involved the development of methods for the accurate assessment of these properties. Useful quantitative information has been accumulated, and the properties of some new materials in these respects have been found to show considerable promise.

A practical process of vulcanization by means of peroxides was developed during 1951, but properties of the vulcanizates left something to be desired; in particular, they tended to be sticky on the surface, to have low tensile strength, and to tear readily. An investigation into methods of compounding has led to very considerable improvement, the report states. Although the peroxide vulcanizates still remain a little inferior in these respects to the best conventionally vulcanized samples, they are now sufficiently good for most practical purposes. It is therefore possible to take advantage of the excellent aging resistance and the very high level of transparency which can be achieved.

Cyclized Rubber Developments

At the end of 1951, the stage had been reached where rubber manufacturers had had the opportunity of evaluating, both on the laboratory and factory scale, the cyclized rubber, in masterbatch form, produced on the pilot plant at RTD. Their reports showed clearly that this material is acceptable as an alternative to the synthetic styrene-butadiene copolymers, and during 1952 there has been ample confirmation of these reports and a rapidly growing demand for material.

The preparation of the cyclized rubber

Comparative Tire Costs

In these inflationary times when the dollar is worth about 53 or 54c in comparsion with its 1939 counterpart, the American motorist is getting far more for his money than he did in the "good old days." The Business Research Department of the B. F. Goodrich Co. has come up with some interesting comparative figures to prove this point. Car owners are presently said to be getting around 32,000 miles out of current tubeless tires selling for about $33. Thus, the cost of 1,000 miles of service per tire is 94c, plus puncture-sealing and blowout protection. Researchers found that the most popular pneumatics in the "flivver" era were good for only 3,500 miles and cost $35. That would be $10 per 1,000 miles, not to mention all the troubles from flats and blowouts.

in masterbatch form appeared desirable, because of the greater ease of admixture in this form with natural rubber on the ordinary rubber mixing machinery. At the same time, the preparation of a masterbatch means that the product can be separated as a coagulum, and subsequently sheeted and dried in a manner similar to that employed for the preparation of crepe in the producing countries, whereas the fully cyclized rubber is a powder which requires special separation equipment, of the centrifugal or filtering type, and suitable dryers. The equipment for handling sheets is already in existence in the Far East, whereas that for dealing with the powder would have to be specially imported.

The work carried out on the pilot plant in Malaya showed that a workable process could be developed, and, at the end of the year, the position was that the process had been established, and negotiations were proceeding for the commercial production of the cyclized rubber masterbatch to meet the urgent and substantial demands of the rubber manufacturing industry for this material for shoe soling compositions. There are ample indications that many other applications will develop as soon as supplies are available.

Oxidized and Depolymerized Rubbers

The exploitation of oxidized and depolymerized rubbers has followed the erection of semi-production scale equipment during 1951. Apart from one particular use for the depolymerized rubber, for which commercial production has been arranged, greatest attention has been paid to the general question of fluid rubber compositions, which are defined as containing neither water nor volatile solvent and capable of being poured and set to form elastic soft rubber or hard rubber articles.

Development work is still proceeding with a number of manufacturers interested in the production of printer's rollers, rubber molds and masters for casting plaster of paris and other materials, hard rubber battery boxes and the sealing of electrical components.

Textile Applications

Laboratory and actual wear trials have shown that fabrics spread by RTD with compositions to give water-impermeable yet water-vapor-permeable proofings are satisfactory. The large-scale wearing trials, consisting of carefully planned experiments to compare the properties of Positized wool socks with untreated ones which have been subjected to the normal commercial "anti-shrink" processes, were completed during the year. Briefly, these trials established the value of the Positex treatment as an anti-shrink process alternative to the chemical methods at present being used by the industry.

The report points out that one fact emerged of some importance, namely, that actual wearing trials showed the Positized half-hose to be more shrink-resistant than one would anticipate from the laboratory shrinkage trials. Just as the rubber holds the fibers mechanically and prevents their movement and consequent felting, so the short fiber is held into the structure of the garment with resultant reduction in the surface piling, and maintenance of the clear-cut knitted structure. In addition, the Positized socks showed decidedly improved wear compared with control socks, the difference, of course, varying according to the type of sock under test and the manufacturer.

Apart from the main effort directed to the specific application to wool half-hose, work is continuing with reference to other applications of Positex. Experience is being gained in the treatment of various textile materials with Positex, including needleloom felts, raincoat fabrics, and linen yarns for special purposes, as well as rugs and carpets. By the use of Positex as a fixative for an insoluble pigment, it is possible to print a pattern or design on to wool fabrics which is satisfactorily fast to washing and wear, the report states. One outlet envisaged is the application of trade marks, etc., to garments, in particular to socks.

RTD has engaged in active development work on bonded fiber (unwoven) fabrics during 1952, continuing work begun the previous year. The project was planned as a relatively long-term one, to develop methods of handling the carded web, applying the latex, and finishing the fabric, employing a wide range of natural animal and vegetable, as well as synthetic fibers, and varying the rubber content of the binder.

The first effort was directed to the use of wool as the main ingredient of the fiber blend, and a potential demand has been found for one type of product. Some 500 square yards were prepared during the latter part of the year by an experimental method, a square at a time. At present, the report states, the construction of equipment is under way to prepare this material in continuous lengths. In the meantime, sample squares of other products are being made, and their uses and properties investigated.

The development of cyclized rubber as an ingredient of soling compositions has brought about a contact with the boot and shoe industry, the report notes. There is every indication that rubber and rubber-containing materials will be used in ever-increasing quantities in the manufacture of shoes.

The development of improved types of floor covering has been investigated for many years by BRPRA. While no report of this matter was made in 1951, a limited amount of work was carried out during 1952. Effort has been directed toward the elimination of press molding. Attempts have been partially successful in preparing tiles by calendering the compound and curing without pressure in dry heat.

As to the latex casting of rigid figures, it was reported in 1951 that this had ceased to be a major project. During 1952, advice and assistance, however, were given to many inquirers.

TYER RUBBER BEGINS PRODUCTION AT NEW PLANT ADDITION

The new 40,000 square foot addition to the plant of the Tyer Rubber Co. at Andover, Mass., recently went into operation The new building embodies many of the most modern features in industrial plant construction. The first floor is devoted to a completely equipped new laboratory and an enlarged roll covering plant. Of special interest are full-area traveling cranes of 20-ton capacity. A large part of the output of the Tyer plant is in canvas and rubber footwear.

Tree Wire Standard Revised

The American Standards Association, New York, N. Y., has announced the revision of the American Standard for rubber insulated tree wire. The standard, published in its original form in 1942, is designed to reduce repair and renewal of electric wires as a result of wear and rubbing against tree branches. The wire specified in this standard is used in areas where electric wires must be run through trees. The use of this tree wire helps to eliminate the unsightly dangling of wire wrappings. Committee C8, which developed the standard, had primarily in mind the prevention of interruptions of electric power service.

Hunt Names Representative

C. B. Hunt & Son, Inc., Salem, Ohio, has announced the appointment of Alfred Halliday with offices at 317 Starks Bldg., Louisville, Ky., 1509 Madison Ave., Memphis, Tenn.; and 916½ Henly Ave., Knoxville, Tenn., as sales representatives for Kentucky, Central and Western Tennessee, Northern Mississippi and Arkansas.

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Defense Begins in DuPont Trial

Wilmington Trust Co., filing the first defense brief following the hearing of testimony in the DuPont anti-trust suit, has asserted that the government has failed to make out a case against the bank and trust company. The company is one of six corporate defendants in the case. The major three are DuPont, General Motors and U. S. Rubber. Thirty-eight members of the du Pont family are also defendants. The government alleged that DuPont and the family controlled General Motors and U. S. Rubber and utilized this control to stifle competition. It seeks to break up certain DuPont interests. In its defense brief, Wilmington Trust stated that the evidence shows not only that the company did not participate in a conspiracy, but also that if such a conspiracy existed, the course followed by Wilmington Trust was such as to thwart it. According to the bank's brief, the government apparently takes the viewpoint that the du Pont family members use Wilmington Trust to effect control of U. S. Rubber. Wilmington Trust is trustee of trusts that hold U. S. Rubber stock.

The brief said that the du Pont family and the Christiana Securities Co., holder of a large amount of DuPont stock, had 24% of Wilmington Trust's outstanding stock. "The government makes the bold assertion that this is sufficient to give the du Pont family voting control of this company," the brief stated. "The record is silent as to the identity or number of holders of the remaining 76% of the stock of the Wilmington Trust Co. In view of this fact, the government's bold assertion is as logically absurd as it is mathematically impossible." According to the trust company, the government's brief disclosed that it had (1) abandoned any charge against Wilmington Trust in its individual capacity, (2) expressly abandoned its charge of a division of fields between DuPont and U. S. Rubber, and (3) implicitly abandoned a charge that U. S. Rubber was compelled to buy the products of the DuPont company and General Motors.

Newman Receives Government Post

James J. Newman, recently retired vice-president of the B. F. Goodrich Co., has been appointed consultant to the Secretary of the Treasury. He will serve as assistant to the National Director of the U. S. Savings Bonds Division, Earl O. Shreve. Mr. Newman, as vice-president of Goodrich, participated in all phases of the company's activities with particular responsibility for sales. He will assist Mr. Shreve in establishing sales policies of the Savings Bonds program and will devote a considerable part of his time to recruiting and maintaining the program's volunteer organizations.

Angell Elected Vice-President

Arthur D. Angell, associated with the Dewey & Almy Chemical Co. since 1927, has been elected a vice-president of the company in charge of the Western Division. He has been manager of operations on the West Coast since 1945.

LOS ANGELES NEWS

Pittman Products of 2050 Laura Ave., Huntington Park, Calif., has just completed a reorganization of its management as well as an expansion of its facilities. T. A. Chesney is now president of the company, while P. D. Chesney is vice-president. A. Furche is secretary-treasurer and Thomas Dantzler is chief chemist. The company was originally organized on June 1, 1946, and has since been engaged in the manufacture of molded rubber products.

The company recently added 10,000 square feet of manufacturing facilities, bringing the total to 35,000 square feet. It now has 22 presses of all sizes, the largest being 24 by 72 inches, a 60 by 40 inch mill, a refiner and two stock cutters. The plant has 150 permanent employees and many more during seasonal operations.

The November 3rd meeting of the Los Angeles Rubber Group held at the Hotel Statler in Los Angeles, Calif., featured an address by Dr. C. W. Sweitzer of the Columbian Carbon Co., who spoke on "The Reinforcement Potential of SAF Black." The meeting was attended by approximately 145 members and their guests. The dinner meeting on November 3 was sponsored by the Orange County Rubber Association, which is composed of Fullerton Mfg., Stoner Rubber, Anaconda Wire & Cable, and the Rubber Corp. of Calif. This meeting was attended by approximately 280 members and guests.

Atlas Sponge Rubber Co. has completed an expansion program which has added 3,000 square feet to its manufacturing facilities. A series of new and larger presses have been added to the new production line. The company announces that the development of new type blown sponge rubber products is continually in progress to meet the requirements and design of specialty items and specification stocks requested by the trade.

Authorize New Preferred Stock

Shareholders of the General Tire & Rubber Co. in a special meeting held in Akron recently, authorized an amendment of the company's charter permitting the issuance by the board of directors of a new class of preferred stock in the amount of $35,000,000. The shareholder authorization was for the setting up of a new class of 350,000 preferred shares at a par value of $100 per share. W. O'Neil, General Tire's president and board chairman, announced that no plans had been formulated for the issuance of the stock at this time. Mr. O'Neil told the shareholders that the company's sales for 1953 would be approximately $210,000,000, the greatest in the company's history. It was also announced that the next directors' meeting will be held on January 19, 1954, at Waco, Texas, the first director's meeting held outside of Akron. It will commemorate the company's 10th anniversary in Texas.

Harwick Introduces "Polyrez"

Harwick Standard Chemical Co., Akron, Ohio, has introduced "Polyrez," a sulfurized hydrocarbon resin that is thermoplastic and oil resistant. It can be plasticized with aromatic oils and a variety of other plasticizers such as dioctyl phthalate, dibutyl phthalate and tall oil. Polyrez is particularly suggested for use with neoprene because of its plasticizing qualities. There is also said to be less tendency to stick to calender or mill rolls with Polyrez. In addition, it may also be used as a processing oil with neoprene. Its electrical properties are good, the company states, and it is said to be an excellent extender for neoprene and can be used to replace GR-S or natural rubber in neoprene stocks with improved results. The company states that the new material appears to have outstanding reinforcing action in non-black GR-S compounds and it is believed that high quality GR-S compounds of different colors can be made using this material as the reinforcing agent. Since Polyrez is high polymeric material it acts like rubber hydrocarbon in many compounds, Harwick states. It is also said to improve the oil and ozone resistance of GR-S compounds in proportion to the amount used. The company states that some firms who have been blending neoprene with GR-S to obtain better oil resistance have expressed interest in Polyrez to accomplish the same thing at lower cost.

Koch Returns to Firestone

Robert W. Koch, who has served as a special assistant to the Secretary of Defense, Charles E. Wilson, for the past seven months, has returned to Akron to resume his duties as director of purchases of the Firestone Tire & Rubber Co. The assignment of Mr. Koch was to secure effective and efficient procurement methods and operations throughout the Department of Defense, according to Deputy Secretary of Defense Roger M. Kyes. Mr. Koch worked with the principal procurement agencies in each of the major divisions of the Department of Defense, concentrating most of his efforts on the new Federal Cataloging and Standardization Program. Born in New Waterford, Ohio, Mr. Koch is a graduate of the University of Pittsburgh. He was employed by Firestone in 1925 and was assigned to the purchasing division of the Firestone Steel Products Co. In 1930, he was named purchasing agent for the parent company and in 1943 was made director of purchases, the position he has held since then.

Dayton Outlines Position

Dayton Rubber Co. of Dayton, Ohio, has announced that it has absolutely no connection, directly or indirectly, with the new company negotiating for control of Keeshin Freight Lines, Inc., of Chicago, Ill. The announcement followed news reports that M. H. Clarke, a vice-president of Dayton Rubber, would become executive head of the freight line. It was stated that this is strictly a private venture on the part of Mr. Clarke, and that Dayton Rubber is in no way involved in the venture.

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CANADIAN NEWS

Twelve rubber companies and the Rubber Association of Canada were fined $170,000 on November 23, for fixing prices and restricting competition in the rubber industry. Justice W. F. Schroeder called the offense "a cold-blooded and deliberate violation of a law set up to guard the public interest."

Seven companies and the association pleaded guilty on November 18 to operating a combine in rubber footwear. Eight companies and the association pleaded guilty on November 16 to a similar offense in automobile tires and tubes.

Special Crown Prosecutor T. N. Phelan estimated the companies "illegally extracted" $1,300,000 a year for the fifteen years they admitted operating the tires combine. The companies replied that they were forced to band together for mutual protection during the depression. Five companies were fined $50,000 earlier this year for operating a combine in mechanical rubber products.

The seven companies fined on the footwear charge were: Dominion Rubber Co., Gutta Percha and Rubber, Ltd., B. F. Goodrich Rubber Co. of Canada, Ltd., Alfred Lambert, Inc., Kaufman Rubber Co., Ltd., Miner Rubber Co., Ltd., and Northern-Woodstock Rubber, Ltd.

Dominion Rubber, Goodrich and Gutta Percha were also fined on the tires charge. Also fined for the tires combine were: Firestone Tire and Rubber Co. of Canada, Ltd., Goodyear Tire and Rubber Co. of Canada, Ltd., Dunlop Tire and Rubber Co., Ltd., Seiberling Rubber Co. of Canada, Ltd., and General Tire and Rubber Co. of Canada, Ltd.

H. W. Rollman, president of both the Wellco Shoe Corp. and Ro-Search, Inc., has announced that Wellco-Ro-Search has entered into an agreement with Kaufman Rubber Co. of Kitchener, Ont. Kaufman Rubber is one of the oldest rubber footwear manufacturers in Canada. Kaufman Rubber has already begun production of "Foamtread" footwear for the Canadian market, and Wellco-Ro-Search is now also contemplating the manufacture of waterproof footwear, based on Kaufman Rubber Company's "knowhow," in the United States. Many of the Wellco-Ro-Search affiliated factories all over the world are already producing waterproof footwear. On the basis of the new agreement, the Kaufman "knowhow" and technical advancement will be made available to these affiliated companies abroad.

Yale Rubber Manufacturing Co., Sandusky, Mich., has announced the appointment of Noel Lee as manager of sales and service for Canada. Mr. Lee, a native of Ontario, attended the University of Western Ontario. He served as a comsioned officer for the Royal Canadian Artillery in the European Theater during World War II. After leaving the Armed Forces he joined the B. F. Goodrich Co., Ltd., at Kitchener, Ont. His past six and one-half years as technical sales representative for extruded and molded rubber products to the industrial trade have made him well known throughout Ontario manufacturing circles. From offices at Kitchener, Mr. Lee will conduct Canadian operations.

Morris C. Hay has been appointed Secretary of the B. F. Goodrich Rubber Co. of Canada, Ltd. Mr. Hay was formerly assistant secretary of the company. In addition to his new appointment, he retains his position as director of employee relations, and legal counsel.

Nopco Chemical Co., Harrison, N. J., has announced the appointment of Robert F. McClellan as vice-president and general manager of Yocum Faust, Ltd., London, Ont., Nopco subsidiary and major Canadian producer of industrial processing chemicals.

Mr. McClellan, since 1942, has been mid-west district manager of Nopco, with headquarters in Chicago. His career at Nopco extends over 25 years. One of the new general manager's first duties will be directing the considerable additions to the Canadian plant, plans for which are now under way.

A recent issue of 2,000,000 shares of stock in the Crown-owned Polymer Corp. at Sarnia, Ont., was not sold to the general public, the Canadian House of Commons was told recently. The information was tabled for Colin Cameron (CCF, Nanaimo), who asked if the reference to the stock issue in the company's 1952 annual report indicated the shares were sold to the public.

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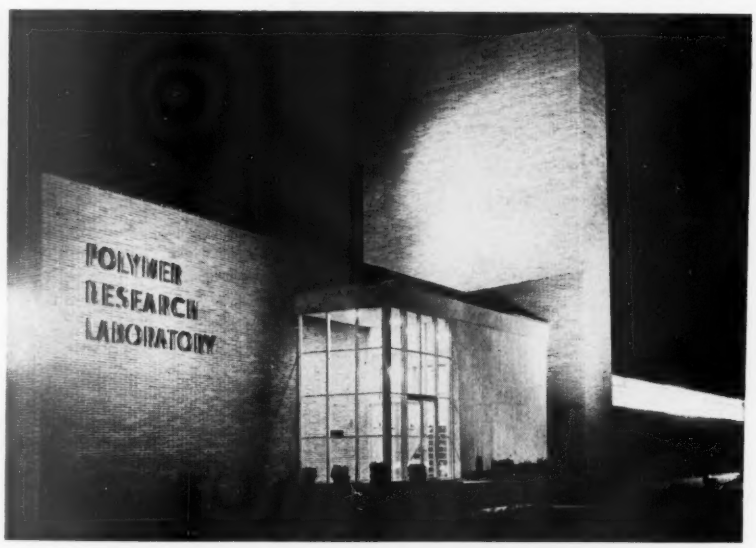
van Rossem Retirement Announced

Professor A. van Rossem, director of the Rubber Institute, T. N. O., Delft, Netherlands, was honored at a special gathering in Delft on November 3 on the occasion of his retirement. The meeting was attended by leading rubber industry figures and featured the announcement that Professor van Rossem had been named to the Order of the Dutch Lion by H. M. the Queen. Professor van Rossem was also awarded with a trip to Indonesia by the Association of Dutch Rubber Manufacturers, Rubber-Stichting and the Indonesian Rubber Research Institute. Several associates of Professor van Rossem spoke in his honor, outlining events from his distinguished career.

Super Service Passenger Tire

First of its 1954 line of tires, the "Super Service," for passenger cars has been announced by Seiberling Rubber Co., Akron, Ohio. The 1954 tire, rated in the original equipment class which is installed on new cars by the manufacturer, will be available in both white and black sidewalls in all sizes. The new "Super Service," the company said, is made of rayon cord and high quality materials throughout, including recently-developed rubber compounds, to give "highly dependable, low-cost mileage and service." The tread is made of long wearing cold synthetic rubber, and the white sidewall rubber contains special protective agents to minimize discoloring and cracking.

EXTERIOR VIEW OF THE NEW POLYMER CORP. RESEARCH LABORATORY



Shown above is a striking night photograph of the exterior of the recently-opened research laboratory of the Polymer Corp. at Sarnia, Ont., Canada. A $250,000 structure, the building provides 20 laboratory areas and a research library.

General Mills Aliphats Reduce Odor ☆☆☆☆☆ Accelerate Vulcanizing ☆☆☆☆☆ Aid Mold Lubrication, Foam Stability

Objectionable Odors in latex foam rubber products can be more than a source of annoyance. Even the faintest traces of these objectionable odors can lead directly to loss of sales.

That's why General Mills feels it would pay you to investigate its Aliphat (fatty acid) 44-B for use in latex foam rubber products. For General Mills has succeeded in almost completely eliminating objectionable odors from this fatty acid.

Also, Aliphat 44-B offers superior foam-rubber performance by making a more stable foam. This foam stability is a result of the rosin acids, which are present in just about their most favorable concentration for this purpose. The rosin acids amount to approximately 15 per cent of Aliphat 44-B, with oleic and linoleic acids each accounting for about 40.5 per cent.

And there are other important characteristics to consider. For example, Aliphat 44-B is considerably cheaper than oleic acid. It saponifies readily, and speeds up vulcanizing action when the rubber is cured.

If you would like additional information on General Mills Aliphats (fatty acids), please mail the coupon below.

Special Controls of Fully-Automatic General Mills Chemical Plant, Kankakee, Illinois, Assure Uniform Composition and Performance of fatty acids.

☆☆☆☆☆

Uniform Performance of fatty acids in rubber compounding and processing is assured when you use General Mills Aliphats. The high quality and uniformity of these fatty acids is maintained through careful selection of materials, closely controlled distillation, and constant progress thru research.

In the manufacture of dense rubber products, for instance, General Mills Aliphats 6-R and 7-R are often used. Each has been developed especially for rubber making.

Aliphat 6-R is a rubber grade stearic acid. It is especially effective as an activating agent . . . to produce the best results in rubber compounding. In processing rubber stock, Aliphat 6-R also does two important jobs for you. It helps disperse the pigment properly, and serves as a mold lubricant.

General Mills Aliphat 7-R, on the other hand, is an undistilled tallow fatty acid. It is partially hydrogenated for better rubber making performance and uniformity. You can save money in raw material, too, by using Aliphat 7-R in rubber formulations where color requirements are not critical.

Rubber specialty manufacturers find Aliphat 7-R useful as an activating agent, an aid in pigment dispersion, and as a mold lubricant. Other uses include synthetic rubber compounding and rubber reclaiming.

For technical information on either Aliphat 6-R or 7-R, just mail the coupon below.

☆☆☆☆☆

In Addition to the Aliphats mentioned, General Mills has a large variety of specialized fatty acids for rubber manufacturers.

For sponge rubber, Aliphats 44-B, 6-C, and 33-B are especially recommended; for foam rubber, Aliphats 44-A and 44-B; and for dense rubber, Aliphats 6-R and 7-R. These and other fatty acids may be used successfully, either individually or in special tailor-made mixtures.

The recent experience of many rubber manufacturers has shown them that mixtures of General Mills Aliphats often give results superior to any other material available. Why? Because, today's fatty acid technology . . . as practiced at General Mills . . . makes it possible for you to use mixtures designed especially for your specific rubber-making needs.

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OBITUARIES

Oscar Nelson

Oscar Nelson, president and general manager of the United Carbon Co., died on November 27 in Kanawha Valley Hospital, Charleston, West Va., after suffering a heart attack at his office in Charleston. He was 74 years old. Mr. Nelson, a Swedish emigrant who came to the United States in 1899, became president of United Carbon in 1926, following its organization through the merger of fifteen American carbon manufacturers. Born in Hvena, Sweden, on March 2, 1879, he came to the U. S. when he was 20 years old and obtained employment at a glass plant at Kane, Penna. After several months, he became a laborer at the Peerless Carbon Black Co. in the same town, remaining with this firm for about a year.

From 1901 to 1914 he was employed by the Raven Carbon Co. and the Carbon Black Manufacturing Co. He came to West Virginia first in 1905 as field superintendent representing the firms and was made superintendent of both companies in 1908 with headquarters in Weston, West Va. In 1914, the two companies were merged together with a number of smaller firms, to form the Columbian Carbon Co. Mr. Nelson served as general manager of this firm until 1916, when he organized the Nelson Co. and entered business for himself, operating plants principally in West Virginia and Louisiana. When the United Carbon Co. was formed by merger in 1926, he became its president, serving in this capacity until his death. Other posts he held include presidency of the United Producing Co., Combined Carbon Co., Westoak Gasoline Co., United Gas Co. of West Virginia, vice-president of Texas Carbon Industries, Inc., Kosmos Carbon Co., Eastern Carbon Black Co., and National Gas Producers Association. He also was a director of Carbon Black Export, Inc. Last October 1, Mr. Nelson received an honorary doctor of laws degree from Upsala College in East Orange, N. J. He is survived by his wife, three sons, one of whom, Oscar, Jr., is executive vice-president of United Carbon, while another, Thomas, is a geologist with the firm, and a daughter.

Emil Schnedarek

Emil Schnedarek, purchasing agent at the General Tire & Rubber Co., Akron, Ohio, died unexpectedly on November 11 while duck hunting near Wooster, Ohio. He was 48 years old. Born in Hungary, Mr. Schnedarek had been associated with the rubber industry since 1922, when he began work in the Mold and Machine Design Department of the Falls Rubber Co. Later, he joined the American Tire and Rubber Co. He joined General Tire in 1929. At the beginning of World War II, he was working as a project engineer for the Stomil Rubber Co., a General Tire affiliate in Poland. Later, he was project engineer at the company plant in Caracas, Venezuela, but was recalled to the United States in 1943 to fill a similar position at the company's Waco, Texas, plant. He returned to Akron in 1946 to work in the Purchasing Department under the late Robert M. Graham. Always an active sportsman, Mr. Schnedarek had one of the largest gun collections in the midwest. Services were held at the McGowan-Reid Funeral Home in Akron. He leaves his wife and daughter.

Carl W. Gay

Carl W. Gay, technical superintendent in the Akron Laboratories of the Goodyear Synthetic Rubber Corp., died at his home in Akron, Ohio, on November 25 after an illness of nine months. He was 49 years old and had been associated with Goodyear for 25 years. From 1949 to 1952 he served as an assistant chief in the Research and Development Branch of the Office of Synthetic Rubber, Reconstruction Finance Corporation. A native of Bethany, N. Y., Mr. Gay was graduated from Rensselaer Polytechnic Institute, Troy, N. Y. Services were held on November 26 with burial in Greenlawn Cemetery, Uniontown, Ohio. He is survived by his wife and son.

Sprigg C. Burkey

Sprigg C. Burkey, who had been associated with the research laboratory of the B. F. Goodrich Co. for twenty-four years before his retirement in 1948, died on November 19 at St. Thomas Hospital in Akron, Ohio. He was 70 years old. Born in Parkersburg, West Va., he had lived in Akron since 1923. Services were held on November 21 at the Akron Baptist Temple with burial in Tallmadge Cemetery. He leaves his wife and three daughters.

Albert C. Slickers, Sr.

Albert C. Slickers, Sr., vice-president of Walker Brothers of Conshohocken, Penna., died on November 11 at his home in Wynnewood, Penna. He was 53 years old. A graduate of the Drexel Institute of Technology, Mr. Slickers had been with the company for thirty years. He was a member of the Conshohocken Association.

New Airport Paving Material

A new rubber paving material that won't be damaged by fuel spillage has just been installed as a topping on airplane parking and service areas at New York International Airport. Approximately 15,000 square yards north of the operations cargo building have been paved with the new material, which is a blend of oil-resistant, plasticized synthetic rubber and tar. Called "Surfa-Aero-Sealz," it was developed for use at airports by the Naugatuck Chemical Division of the U. S. Rubber Co. The rubber-tar blend is unaffected by gasoline or oil, and also prevents water from seeping down to the lower layers of the pavement, the company states. A one-and-a-half inch layer of the material was applied over several layers of base material. It is anticipated that this surface coating will increase the life of the new pavement, and greatly decrease the annual maintenance costs.

The installation was made under the supervision of the Port of New York Authority, which tested the new rubber-based paving material for approximately two years before deciding to use it. This is said to be the largest use of this rubber-based material on a municipal airport. Its most extensive use previously had been on military airports. The most recent military installations of the rubber-based paving material were at McChord Air Force Base, Tacoma, Wash., and Davis-Monthan Air Force Base, Tucson, Ariz. Both jobs, which were about four times as large as the present installation, were completed within the last few weeks.

Goodrich Tubeless Plane Tires

Tubeless tires for use on commercial airplanes are being manufactured by the B. F. Goodrich Co., according to a recent announcement by E. F. Tomlinson, vice-president of the company's Tire Division. The new tires are lighter in weight than conventional tread-and-tube combinations and can be warehoused and mounted with more ease than tires and tubes, according to Goodrich. The company announced the successful testing of tubeless tires for U. S. Navy aircraft in March of this year.

Charles Schaffnit, Jr.

Charles Schaffnit, Jr., senior research chemist for the Johns Manville Co. at Manville, N. J., died of a heart attack on September 8 at the Sherman Hotel in Chicago, Ill., where he was attending the 64th meeting of the Division of Rubber Chemistry, American Chemical Society. He was 31 years old. Born in West Haven, Conn., Mr. Schaffnit was graduated from Purdue University and had studied at Yale University for his master's degree. He was a member of Sigma Nu, the Rubber Division, A.C.S., the New York Rubber Group, and was a 32nd degree Mason of the Scottish Rite. In his memory, Mr. Schaffnit's family has donated to the Johns Manville Research Center his extensive library of technical literature. He is survived by his mother and brother.

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NEW GOODS

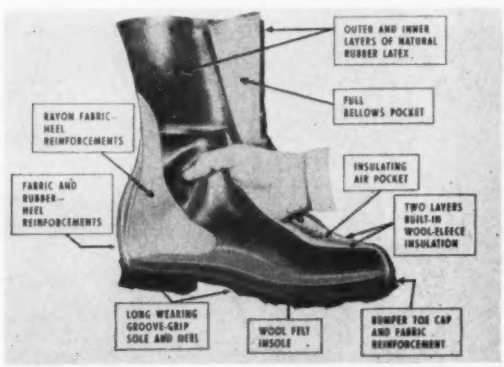
Dennis the Menace Doll

Glad Toy Co., 200 Fifth Ave., New York, N. Y., has introduced a new doll based on the popular cartoon character, "Dennis the Menace." An all-latex doll, Dennis

has a molded vinyl head which was originally sculpted by the cartoonist himself, Hank Ketcham. Dennis is 17 inches high and is dressed in denim overalls and T-shirt.

Goodrich "Subzero Pac"

B. F. Goodrich Co., Akron, Ohio, has introduced the "Subzero Pac", the "Thermos Boot" of armed forces fame which is now available for civilian use. Built on the principle of the thermos bottle, the boots insulate the foot against temperatures as low as 40 degrees below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FABRIC AND RUBBER-HEEL REINFORCEMENTS
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LONG WEARING GROOVE-GRIP SOLE AND HEEL
WOOL FELT INSOLE
BUMPER TOE CAP AND FABRIC REINFORCEMENT

zero. Subzero Pacs were first made as an answer to the demand for foot protection for Marines and Navy personnel. They were developed by the Goodrich research staff of the Hood Rubber Division in cooperation with the Naval Clothing Depot in Brooklyn, N. Y.

"Qua-Seal Freon Hose"

What is said to be the first leak-proof, flexible hose ever developed for freon refrigerant gas has been announced by Quaker Rubber Corp., Division of H. K. Porter Co., Inc., Philadelphia, Penna. "Qua-Seal Freon Hose" is made with a special synthetic tube which prevents permeation of this highly volatile gas. Users report the diffusion rate of freon through Qua-Seal to be less than 5% of the rate experienced on other types of hose. This hose is reinforced with 2 layers of braided textile,

and is designed to withstand the wide temperature range found on both the suction and discharge sides of the refrigerator compressor. It can be used with working pressures as high as 400 p.s.i. Designed especially for carrying freon gas used in refrigeration systems, Qua-Seal Freon Hose is also recommended for carrying lacquers, lacquer solvents, naphtha, kerosene and many chemicals.

"XDC" Conveyor Belt Cover

The Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., has developed a new conveyor belt cover which, the company says, promotes resistance to abrasion and tearing never before attained. This means longer conveyor belt life, especially under heavily abrasive conditions, such as with ore, rock and coal. Known as the "XDC" Conveyor Belt Cover, it is being applied to a wide range of Raybestos-Manhattan belts. Described by the company as a radically new blending of superior and improved ingredients, the new belt cover provides the truest balance-of-wear between strength members and cover yet devised.

SEE PAGE 326

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Laundry Rub-A-Dub-Mit

A new glove with built-in washboard type ribs made of Bakelite vinyl resin-base plastisols for doing laundry quickly and conveniently in basin or sink is being distributed by the Dean Vail Corp., Paterson, N. J. Nylon stockings, silk lingerie, gloves, baby clothes, shirts and other light laundry are quickly rubbed clean by the handy glove in the wash basin at home or in the hotel room

while traveling. The glove, called "Rub-A-Dub-Mit", weighs only four ounces and is flexible enough to be folded and carried in a pocket or overnight bag. The washboard glove also removes stubborn dirt spots on shirt neckbands, kitchen linen, dungarees or blouse cuffs before laundering clothes in the home washing machine. The glove is available in yellow, green, blue and pink colors and covers the wrist completely.

So-Lo Marx Space Totes

So-Lo Marx Rubber Co., Loveland, Ohio, has introduced a new line of rubber overshoes called "Space Totes". Made of natural rubber latex, they are seamless and will not crack or split. They are said to have

a natural body heat retention quality which keeps feet warm without tiring weight. Space Totes have a triple-thick sole to provide for long wear and hard play, corrugated to prevent skids and slips on icy pavements.

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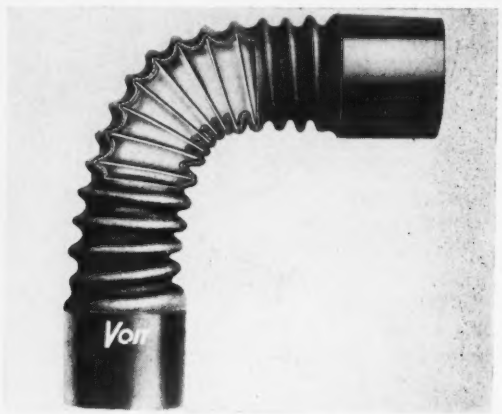
Voit Flexible Radiator Hose

W. J. Voit Rubber Corp., 1600 East 25th St., Los Angeles 11, Calif., has announced another improvement in its flexible radiator hose—the addition of a neoprene lining which increases both the longevity and functioning of the product. In addition to the neoprene



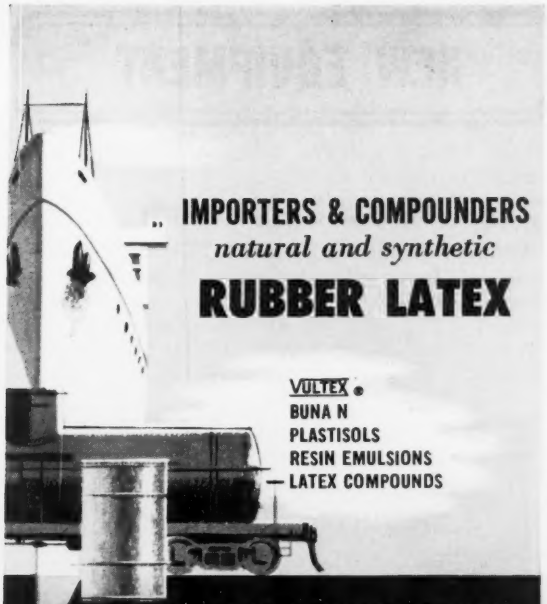
lining, which protects the inside, Voit has also added a new spray on the outside, "Protector-Kote", which guards against the checking and weathering caused by the sun, heat, oxygen and ozone. The company states that the new improved hose will outlast and outperform hoses made from synthetic and natural rubber.

"Evergreen" Neoprene Clothing

New, high grade neoprene latex clothing in olive drab color has recently been developed by M. L. Snyder & Son, Boston Ave., Philadelphia 25, Penna. This tough, yet comfortable clothing is coated inside and outside with neoprene and will not snag, peel, stick, crack or wear out easily. It is ideal for use where protection from rain, salt water, acid, paint, grease, oil, gasoline, alkali, etc., is required. It will last two and three times as long as old fashioned rubber clothing or oilskins, and is extremely flexible, the firm states. The Snyder "Evergreen" neoprene clothing, which includes jackets, long and short pants, coats, aprons, sleeves, leggings, sou'wester hats, etc., is available in two weights—a heavy, for severe work and long service, and a medium for those desiring something thinner, cooler and cheaper, as this is only dip-coated on the inside before sewing. Bolts of the cloth are available, too, for those who wish to make their own clothing.

All-White Rubber Matting

A new all-white rubber floor matting has been perfected for the first time by the Boston Woven Hose & Rubber Co., Cambridge, Mass. Known as "Nu-Tread Alpine White," the corrugated rubber floor matting is a dead white with black backing. The new all-white rubber matting was made possible by the process known as "Rotocure," a rubber curing method developed by the Boston firm, which provides even vulcanizing and thickness plus uniformity of stretch and color. Certified safe, sound absorbent and resistant to rough wear no matter how often it is rolled or re-rolled, the company said the new matting has been subjected to severe testings and has proved itself resistant to chemicals and alkalis.



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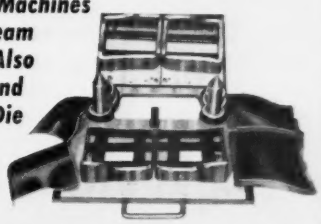

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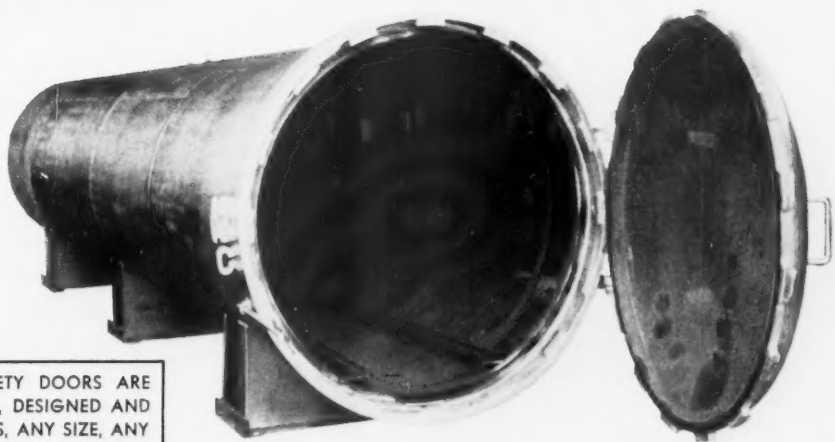

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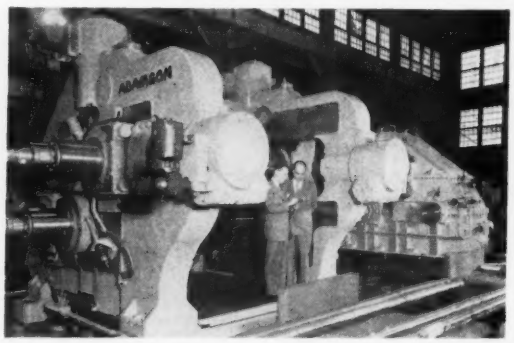
NEW EQUIPMENT

Adamson Zee-Type Calender

Adamson United Co., Akron, Ohio,, has introduced its latest "Zee-Type" calender, a 28 by 78-inch unit especially designed for double-coating tire cord or producing two-ply laminated material, at speeds up to 240 feet per minute. The improved features of this calender are said to greatly increase the accuracy of calendering



operations and to assure a more uniform product with substantial savings in material.

All four rolls are the peripherally drilled type, and are drilled for "triple pass' circulating water temperature control. Both of the offset rolls are equipped with motorized crossed axis equipment for crossing, or skewing, the rolls in the vertical plane. The exact positions of the roll boxes are controlled by push-buttons and are indicated in thousandths by selsyns and counters. By crossing the rolls, the operator can compensate for deflection of the rolls by, in effect, adding or subtracting crown.

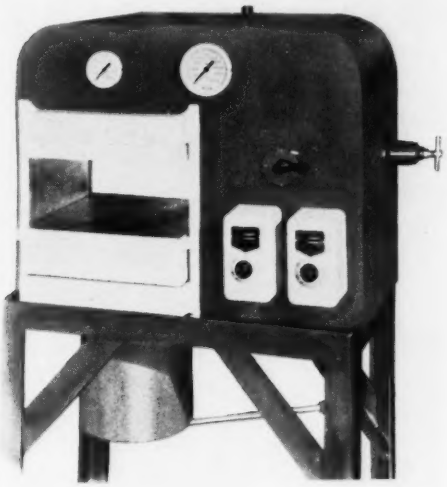
The calender is driven by a separate pinion stand, totally enclosing double reduction bull gear and pinion set and all connecting gears. Universal spindles of the anti-friction bearing type are used to drive the calender, instead of the bronze slippers previously used on older units. The bearings are sleeve-type, full circle bronze, Tuftin lined, and are cooled and lubricated by a circulating oil lubrication system. Roller bearings are also available for main bearing boxes. There are separate self-contained lubrication systems for the calender and for the pinion stand. Auxiliary pullback bearings (zero clearance) are provided for removing main bearing clearance and screwdown clearance.

The same calender design, equipped with a single crossed-axis roll and with certain other relatively minor modifications, can be used satisfactorily for producing plastic film and sheeting.

General Electric, Schenectady 5, N. Y., has announced two new **photoelectric relays** featuring higher contact ratings, improved circuit design, and a full line of enclosures. The relays, one rated at 450 o.p.m. and the other at 600 o.p.m., may be used in many applications of counting, sorting, indicating and controlling.

Atlas Hydraulic Press

A new type of hydraulic press believed to be unique in its adaptability for both laboratory and production uses has been introduced by Atlas Hydraulics, Inc., 3576 Ruth St., Philadelphia 34, Penna. The unit has been designed for precision molding of rubber and plastics and



for other uses where controlled heat and pressure are required. Used for production work, it reduces costs and speeds production. The press is a small, compact unit, accommodating 12 by 12-inch platens, and the equipment can be easily handled by women operators. The press is electrically-heated and air operated. Each unit is equipped with individual controls which make it possible to regulate hydraulic pressure for each operation with a touch of a finger, within a range of 50 to 4000 psi, the hydraulic pressure aggregating approximately 55 tons capacity.

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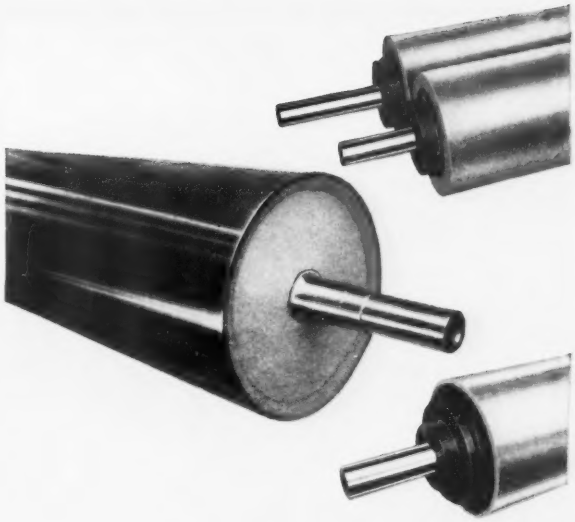

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New Stress-Strain Recorder

A new stress-strain recorder, Model SRA-1, for use primarily on the new SR-4 type, Model FGT, universal testing machine is announced by the Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa. Strain is recorded on a chart from indications of wire strain gages or SR-4 extensometers by automatic rotation of the drum. Load is recorded by movement of the stylus parallel to the axis of the drum. The stylus is driven

mechanically by the load indicator mechanism of the testing machine, which may be any of several Baldwin machines.

Stress-strain records can show continuous reversals between tension and compression when the recorder is used on the SR-4 universal testing machine with an SR-4 extensometer. Zero position of the stylus may be set at the middle of the chart and a 5-inch load record obtained for either 50 percent or 100 percent of the indicator range in use. When zero position is set at either end of the chart, full-scale 10-inch load records may be obtained for full scale of the testing machine indicator range. Magnification ratios and measuring ranges can be established to meet practically every test requirement. Choice of magnification ratios of 50, 100, 250, and 500 to 1 is made by turning a rotary selector switch.

A strain-range selector provides nine ranges between 800 and 80,000 micro-inches when used with SR-4 strain gages; the recorder can be used with one, two or four active gages in an external measuring circuit. Adjustments for the full range of strain gage factors between 1.7 and 2.2 and for standard gage resistances of 60, 120, 240, and 500 ohms are made by two compensator knobs.

The recorder operates on 50-60 cycle, 100-volt power. Accuracy is unaffected by ordinary variations in electronic tube characteristics or by normal power supply voltage variations. Accuracy of both load and strain measurements is 0.2 percent of the recorder range or 0.5 percent of recorded value. Standard 50-yard rolls of chart paper are used in the magazine type drum of the recorder which has maximum strain-recording speed of 1¼ inches per second.

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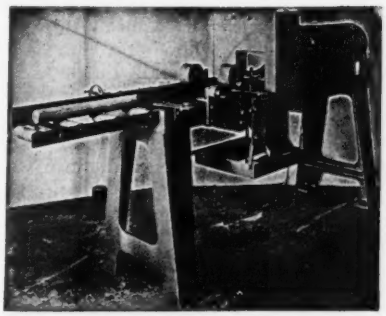

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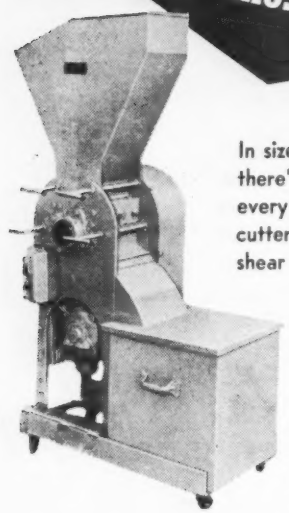

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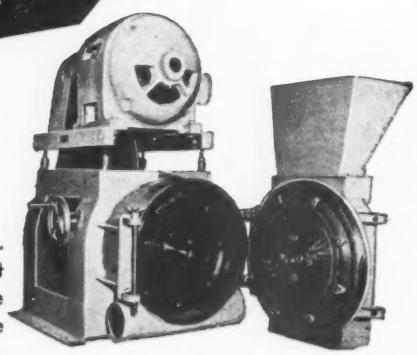

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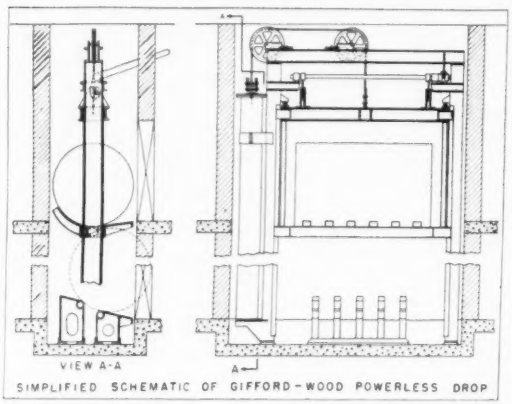

In operation, the load is rolled onto the carriage, the release lever is pulled, and the load descends to the floor below. To cushion the fall, a piston-like counterweight, housed in a cylinder, moves up as the carriage moves down. As the counterweight rises it forces air through a needle-valve opening at the top of the cylinder. The energy expended in forcing the air through the opening controls the motion of the counterweight and carriage.

The counterweight weighs more than the carriage and when the load is discharged the carriage rises for the next load. As the counterweight moves down, its motion again is controlled by the air in the cylinder which this time must be forced through a needle-valve opening at the base of the cylinder. Needle-valve openings may be regulated to control the rate of ascent or descent. Carriage guides ride along replaceable plates mounted along the sides of I-beams which form the frame-work of the drop.

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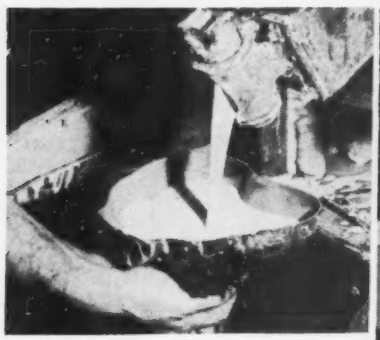

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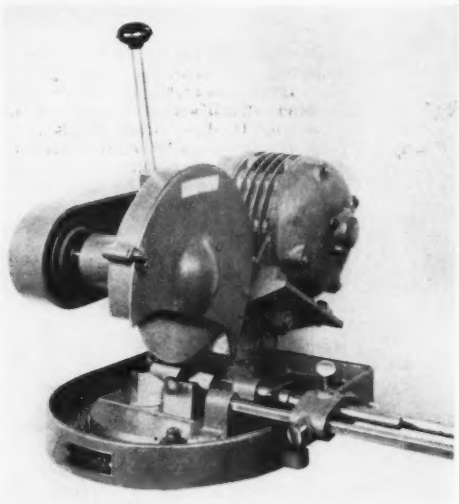
A bench mounting, dry abrasive cut-off machine, suitable for cutting rubber, plastics, ceramics and hard metals, has been announced by the Joseph E. Murphy Co., 24 Ellsworth St., Worcester 3, Mass. The Model D-1 "Catskill Abrasive Cut-Off" features a spindle of alloy steel and is equipped with ball bearings. The abrasive wheel and motor are balanced in a heavy cast



iron "I" spindle frame doing away with the necessity of counter weights and balances which materially lessen the load on the trunnion bearings. The spindle frame has an adjustable two-way stop to regulate the depth of the cut and save lost motion.

The wheel guard of the unit is of heavy construction and is bolted to the spindle frame and equipped with a special panel which may be quickly removed for changing wheels. The swivel vise of the V block type allows cuts from right to 45° angles, and can be rapidly locked in place. A cutting gauge which is fastened to the swivel vise, allowing for its use in cutting angles, is adjustable from 0 to 18 inches. This gauge is quickly removable.

Weighing 220 pounds, the unit is 29 by 35 by 24 inches high and features a 10-inch diameter wheel with a ⅞-inch hole. Power transmission from the totally enclosed, 1½ hp, 3-phase, ball bearing, 3,600 rpm motor is by 2 V-belts. Wheel speed is 9,000 fpm.

Slonneger Products Co., 1524 Milburn Ave., Dayton 4, Ohio, has introduced a new type **self-filtering hood,** designed for polishing and buffing wheels and belts. Utilizing a new principle, dust is withdrawn and controlled by the wind created by the revolving buffing or polishing wheel or belt. It is known as the Elim-O-Dust.

Designed for handling large reels up to 96 inches in diameter and weighing up to 20,000 pounds, a new specially designed **powered platform truck** has been introduced by the Elwell-Parker Electric Co., Cleveland 3, Ohio. The new unit is equipped with a rocking platform and a powered winch.

REVIEWS

BOOKS

Latex in Industry (Second Edition). By Royce J. Noble. Published by Rubber Age, 250 West 57th St., New York 19, N. Y. 6 x 9 in. 912 pp. $15.00 (U.S. and Canada); $16.00 (All Other Countries).

Reviewed by Dr. Paul Stamberger

There has been an urgent need for some time for an up-to-date book on latex technology. The first edition of Noble's book was published in 1936 and the excellent treatise on the same subject by Flint was issued in 1938. Both books have been out of print for many years. Accordingly, this second edition of "Latex in Industry," almost three times the size of the first edition, should receive a warm welcome by workers in the latex field. It is a reasonably correct presentation of the current state of latex technology.

The 912 pages of the current edition are subdivided into three parts, two major and one minor, with 10 chapters dealing with the characteristics and processing methods for latex, the next 13 chapters treating with various manufacturing processes based on the use of latex, and the final chapter covering testing methods for latex and latex compounds.

The entire field of latex technology is fairly well covered in the book, although the lengths of some of the chapters seem disproportionate to the importance of certain fields. For example, 13 text pages are devoted to Porous (Foam) Rubber and 8 pages to Adhesives, although these two uses represent the largest volume outlets for latex. It is hoped by this reviewer that these sections will be expanded in accordance with their importance in any further planned edition.

A considerable portion of the book—375 pages—is devoted to bibliographical references. The great number of references included is indicative of the tremendous amount of work involved in an undertaking of this kind. Unfortunately, however, at least as far as this reviewer is concerned, no references are made in the text to any specific literature references, with the result that text and bibliography are not connected and must be used separately. Although the bibliography sections, which are appended to each chapter, are carefully subdivided and the various subjects are listed under well chosen headings, their use may be found somewhat time consuming.

Obviously, where thousands upon thousands of references are involved, some errors are bound to creep in, no matter how diligent the compilation and the care expended in checking and proofreading. A few errors were noted by this reviewer, including an article credited to Stevens (page 89) which was written by Stamberger. Some of the errors involved the volume numbers of technical journals, but these are of a typographical nature and the articles referred to can be located. Where patents are concerned the year of patent is shown in most cases but omitted in others. It might have been preferable to show U. S. Patent No. 2,311,136 under "Dewebbers" instead of under "Oxalates" (page 330).

There seem to be a few statements in the text which could stand some correction, such as the table on "Conductivity" on page 79 which seems to be incorrect. The illustration on page 481 indicates steam vulcanization rather than an air cure. It is also suggested that the value of the presentation might have been improved by including mention of the very latest type of equipment, such as the Attritor under milling, the Versator under deaerating, and up-to-date washing machines for foam rubber. In the chapter on "Porous Rubber," mention might have been made of vulcanization in live atmospheric steam which is now in current usage.

If the above paragraphs would seem to detract from the value of the book, such is not the reviewer's intent. The book con-

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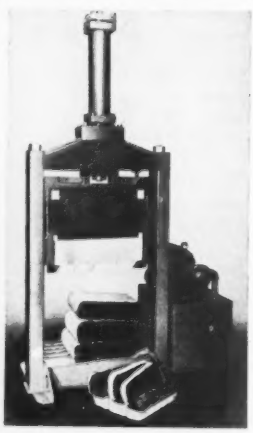

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tains a great deal of useful information presented in a concise, understandable manner and every worker in the latex field will benefit from it. It will prove invaluable to newcomers in the field and is a most welcome addition to the sparse technical literature in the growing field of latex.

Reviewed by Dr. Philip Schidrowitz

(Reprinted from *India-Rubber Journal*, November 21, 1953)

The first edition of Dr. Noble's "Latex in Industry" (published in 1936) has been out of print for a number of years. In his preface to this new edition Dr. Noble certainly does not exaggerate when he says (referring to the original edition): "In the period since its publication, many important advances in latex technology have been made. It seemed desirable, therefore, to revise the text to conform to current knowledge and practice in the latex industry." The first observation in this respect, of course, is that since the first edition appeared the great United States synthetic rubber industry has been developed, and that this in turn has led to the production of a number of synthetic latices. Previous to 1936 the only latex, by and large, to which the terms "synthetic" could be applied was the short series based on neoprene (then known as DuPrene). The DuPrene latices could also be classified as artificial dispersions inasmuch as they were produced by dispersing the corresponding solid synthetic rubber.

In his chapter on "Synthetic Latices" in the present volume the author describes (*inter alia*) concisely the methods typical of manufacture of some of the principal synthetic rubbers (GR-S, Buna N, neoprene). This description will be found useful by those who are not familiar with the meaning of "short-stopper"; "stripping" and the like. The chapter on "Synthetic Latices" also, of course, deals with the properties of various synthetic latices and ends, in accordance with Dr. Noble's scheme, with a Bibliography.

The amazing development in the latex industry is reflected in the remarkable growth of Dr. Noble's book. The 1936 Edition covered 384 pages (including indexes); the present, Second Edition runs to 918 pages inclusive. The sub-division of matter is similar to that in the first edition except that there are now 25 chapters as against 24, the extra chapter, which deals with the "Examination of Latex and Latex Compounds," forming Part III of the work. This latter is further eloquent testimony to the advance in scope and importance of the latex industry, covering as it does 103 pages, whereas in the first edition some 25 pages were devoted to the same subject.

As indicated above, each chapter ends with a Bibliography bearing on the subject treated. The value of each Bibliography is enhanced by sub-headings and sub-divisions of the latter. Thus, for example, the Bibliography relating to "Properties of Latex" has the main headings: General Properties; Physical Properties; Chemical Properties; The Disperse Phase, and Properties of Latices Other Than Hevea. Each of these sub-headings has a number of sub-divisions: For example, "General Properties" has six sub-divisions (e.g., General, Properties of Clonal Latex, Properties of Commercial Latex Types, etc.). "Physical Properties" has 22 sub-divisions, and so on. The width of the Bibliography net may be further judged by the fact that the Bibliography of "Properties of Latex" covers 48 pages; "Concentration" 13 pages; "Synthetic Latices" over nine pages, and so on.

The 25 chapters deal with an enormous amount of detail relating to Properties of Natural and Synthetic Latices, Commercial Varieties, Compounding, Processing, Applications, and Testing. Dipping, Impregnation, Foam Production, and Molding (Casting) may be given as examples of matter covered by chapters on processing and applications.

We have made a point of dealing somewhat fully with the Bibliographies inasmuch as they form a valuable guide to the literature and leave the main text clear of numerical references. There may be differences of opinion as to the method of handling "references" but on the whole we are inclined to think that the one adopted by Dr. Noble gives a better over-all picture of the

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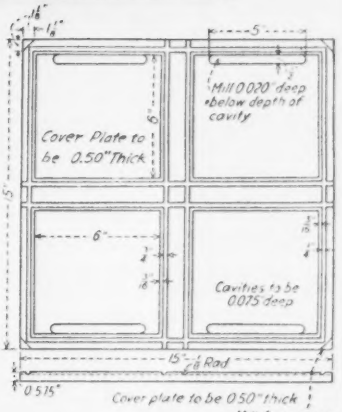
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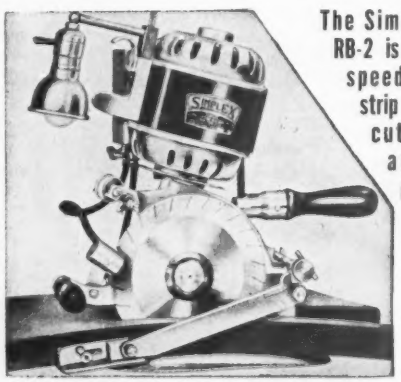

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literature in general and of the specific subjects treated in each foregoing chapter.

The test of consultation by way of the indexes in conjunction with the bibliographies and/or text has been applied in a number of instances, with satisfactory results.

The illustrations (119 Figs.), some of which are of scientific interest, others bearing on practical applications, form a valuable addition to the interest of the publication. It is, we think, not too much to say that all those interested either in the science or technology of latex will wish to add Dr. Noble's book to their library.

•

Pyrometer Supplies: Thermocouple Assemblies and Components. (Buyers' Guide 100-5). Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Penna. 8½ x 11 in. 48 pp.

Honeywell pyrometer supplies are illustrated and described in this newly-revised catalog. All general thermocouple assemblies and components are listed, as well as many special purpose items. Prices and several pages devoted to selection, care, and application of thermocouples are also provided.

•

Automatic Instrumentation to Accelerate Research. (Bulletin No. 14-1). Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Penna. 8½ x 11 in. 6 pp.

This bulletin describes various "ElectroniK" instruments which are designed to speed up research and test problems. The bulletin briefly cóvers the way such instruments can help the research man, and includes descriptions of various servo-components and accessories which are also useful to the research and laboratory technician.

•

Armstrong Pure Foam. Pure Foam Division, Armstrong-Norwalk Rubber Corp., Norwalk, Conn. 8½ x 11 in 12 pp.

This publication traces the formation of the company's Pure Foam Division, and then proceeds to outline the method by which a typical foam rubber article is produced. The process is followed, step-by-step, in a picture sequence which illustrates every phase of the process. The latter part of the booklet is devoted to some of the commercial products in which the company's foam rubber has been used successfully.

SEE PAGE 326

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- **NO DETRIMENTAL EFFECT ON** the cure or physical properties of rubber
- **Allows Stock to Run Cooler**

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Please ship on approval 1 gallon of LIQUIZINC

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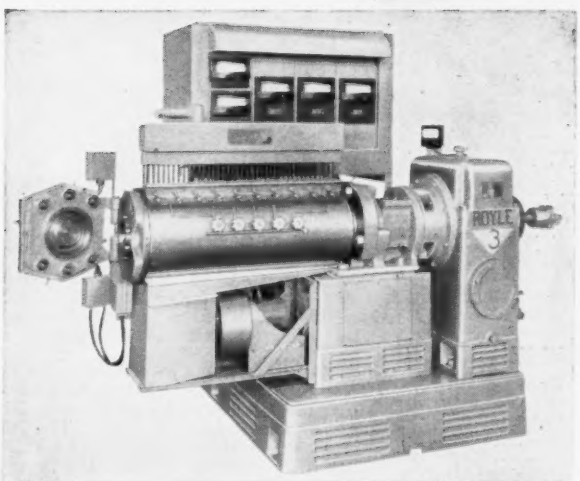
FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

*Patent Applied For

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

MARKETS

NEWS-PRICES

NEW YORK, DEC. 11, 1953

Raw Rubber

Natural: Since our last report (November 16), the average price of spot rubber on the New York Commodity Exchange has swung in a range of 1.50c, high for the period being 21.88c reached on December 8 and 10, and low being 20.38c reached on November 19. The average price of spot rubber for the month of November was 20.58c based on 18 trading days. This compares with 20.82c in the previous month.

There seems to be little question that Washington would like to see the rubber markets stabilized, so that the economy of the Far East would be aided. The trade believes there is a question, however, as to whether the recent measures adopted by the government with relation to rotation of the stockpile will serve this purpose for more than a short period.

Rubber dealers and importers in the United States have always been ready to obtain No. 1 Ribbed Smoked Sheets as it was a certainty that this grade could readily be moved to government buyers. Now, with the alteration of the rotation program, there is doubt that dealers will be eager to take the No. 1 R.S.S. The difference between No. 1 R.S.S. and the lower grades of ribs has been narrowing. For example, the spread between No. 1 and No. 2 R.S.S. is now no more than ¾c a pound. Should the difference go to between ¼ or ⅛c, U. S. consumers would probably be more inclined to take the top grade. The spread between No. 1 and No. 4 ribs is now less than 2c against the difference of 4c a pound at one time and a 3c difference only about a month ago.

Synthetic: For some time, natural rubber producing interests have been suggesting that the price of synthetic rubber be increased. There has been talk that if raw materials were to be purchased by private industry, the price of synthetic would be much higher.

On December 7, the Business and Defense Services Administration released its statistics on consumption of GR-S in defense orders. The declassification order was issued at the request of RFC, which obtains all the materials used in making synthetic rubber. The companies who supply these materials now have their contracts with RFC up for renegotiation.

The Renegotiation Board had ruled that the contracts were subject to 100% renegotiation, but later reversed itself when the suppliers contended that not all the synthetic rubber made from their materials was used in filling defense orders.

This clearly illustrates, the trade believes, that suppliers of the raw materials were more than satisfied with existing RFC contracts, or they would not have stressed end-product differential as to private or defense orders. This may indicate that private industry could do as well, if not better, in making purchases of raw materials for synthetic rubber. It can almost be accepted from the foregoing, that a hike in the price of synthetic rubber is not contemplated in the near future.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM NOVEMBER 17 TO DECEMBER 11

Nov.	Spot	Mar.	May	July	Sept.	Sales
17	20.50	20.35	20.35	20.50	20.50	31
18	20.62	20.45	20.50	20.45	20.45	49
19	20.38	20.10	20.10	20.10	20.15	36
20	20.50	20.30	20.30	20.30	20.35	41
21	—	—	—	—	—	—
22	—	—	—	—	—	—
23	20.88	20.73	20.73	20.85	20.85	36
24	21.12	21.00	21.10	21.15	21.15	42
25	20.88	20.80	20.80	20.80	20.80	72
26	—	—	—	—	—	—
27	21.12	21.20	21.30	21.30	21.35	65
28	—	—	—	—	—	—
29	—	—	—	—	—	—
30	21.38	21.25	21.25	21.25	21.30	14
Dec.						
1	21.25	21.17	21.20	21.20	21.25	16
2	21.38	21.15	21.24	21.24	21.25	19
3	21.25	21.05	21.10	21.10	21.15	48
4	21.62	21.50	21.50	21.50	21.55	41
5	—	—	—	—	—	—
6	—	—	—	—	—	—
7	21.75	21.56	21.60	21.65	21.65	9
8	21.86	21.65	21.70	21.70	21.75	20
9	21.75	21.50	21.60	21.55	21.60	18
10	21.88	20.60	20.60	20.70	20.70	55
11	20.75	20.65	20.70	20.70	20.75	25

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.20¾
December	.20¾
January	.20¾
Thin Latex Crepe:	
Spot	.23¼
Thin Brown Crepe, No. 2	.18
Smoked Blankets	.17½
Flat Bark Crepe	.15½

London Market

(Standard Smoked Sheets)

Jan.-Mar.	20.65 - 20.79
Apr.-June	20.79 - 20.94

Singapore Market

(Standard Smoked Sheets)

December	19.07 - 19.18

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.490 - .500	
Butaprene NL	.500 - .510	
Butaprene NAA	.540 - .550	
Butaprene NXM	.580 - .590	
Chemigum 30N4NS	.500 - .510	
Chemigum 50N4NS	.500 - .510	
Chemigum N3	.580 - .590	
G-E Silicone Rubber (compounded)	3.15	-4.00
G-E Silicone Gum (not compounded)	—	-4.48
GR-I	—	- .220
GR-S	—	- .230
Hycar OR-15	.580 - .590	
Hycar OR-25	.500 - .510	
Hycar OS-10	.550 - .560	
Neoprene Types AC and CG	—	- .550
Neoprene Type GN	—	- .410
Neoprene Type GN-A	—	- .410
Neoprene Type GRT	—	- .420
Neoprene Type KNR	—	- .750
Neoprene Type Q	—	-1.00
Neoprene Type S	—	- .420
Neoprene Type W	—	- .410
Neoprene Type WRT	—	- .450
Paracril B	.500 - .510	
Paracril BJ	.500 - .510	
Paracril C	.580 - .590	
Silastic (compounded)	2.35	-4.40
Thiokol Type A	—	- .470
Thiokol Type FA	—	- .640
Thiokol PR-1	—	- .950
Thiokol Type ST	—	-1.000

Middling Upland Quotations

	Nov. 16	December 11		
	Close	High	Low	Close
Dec.	32.86	32.80	32.57	32.68
Mar.	33.32	33.10	32.93	32.95
May	33.53	33.26	33.10	33.10

Liquid Latex

Natural: According to Latex & Rubber, Inc., October's estimated consumption of 5,700 long tons of Hevea latex solids continues the increasing rate from the mid-year low. Even with the influence of fewer working days in December and the reduction in usage in certain Christmas consumer items, it is expected that consumption will continue at around 5,500 tons of Hevea during November, December and January.

Present price levels of Hevea of under 30c have encouraged its use in broader lines, particularly in foam products. At these prices, with appropriate compounding, Hevea latex can re-enter the textile and carpet fields where certain GR-S latex types have been used because of the price having been advantageous while Hevea latex was at higher levels. Very recent prices for nearby latex were at the 29 to 30c range.

Synthetic: U. S. prices of GR-S latices presently range from 21½ to 26c per pound solids, in tank cars, f.o.b. works; a uniform freight rate of 1c per pound net weight charged by the Reconstruction Finance Corporation pays the freight to the buyer's destination within the United States.

It is estimated that some 3,600 tons of GR-S latex were consumed in the U. S. in October, against the approximately 3,700 tons consumed in the previous month. Neoprene latex is consumed in the U. S. at the rate of about 700 ton solids per month, and recent estimates indicate between 1½ to 2 months supply as stocks. Acrylonitrile latices are being consumed at a rate just over 300 tons a month with stocks apparently between 2 and 3 months supply, the trade estimates.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of .40c since our last report (November 16), high for the period being 33.85c reached on November 24, and low being 33.45c reached on December 3. The average price of middling uplands for the month of November was 33.60c based on 18 trading days. This compares with 33.53c in the previous month.

The Export-Import Bank has signed an agreement with the Bank of Japan activating a cotton credit of $60,000,000 authorized on October 21. Under the terms of the agreement, effective as of December 3, cotton purchased under contracts dated subsequent to December 3 and shipped subsequent to date of the contract of sale will be eligible for financing under the line of credit.

The Commodity Credit Corporation has reported that in the period to December 4, cotton loans totaled 4,572,076 bales. The net stock was 4,549,958 bales. The 1952 loan stock totaled 2,307,227 bales with repossessions totaling 593,100 bales, leaving a net stock of 1,714,127 bales.

Senator Estes Kefauver (Dem., Tenn.), has protested to Secretary of Agriculture Benson that the Department's 1954 cotton acreage will "severely cripple the agricultural economy of the South and the nation." The Senator urged the Secretary to use emergency powers to increase the allotment from 17,900,000 acres to 21,315,000 acres, the figure recently agreed to by a Senate Agriculture subcommittee.

MARKETS

NEWS-PRICES

NEW YORK, DEC. 11, 1953

Reclaimed Rubber

The Commerce Department reports that in the first ten months of 1953, some 253,000 tons of reclaimed rubber were produced, about 25,000 long tons more than had been produced in the first ten months of the preceding year. In the first ten months of this year, consumption was estimated at about 240,000 tons, about 10,000 tons more than had been consumed in the comparable period of 1952. Exports in the 1953 period totaled 9,500 tons, about 400 long tons more than in the first ten months of 1952. As of October 31, there were 30,800 long tons of reclaim on hand, against the 31,450 on hand on October 31, 1952.

With consumption of reclaimed rubber running only 10,000 long tons ahead of the previous year's total, it appears as if usage in 1953 will not greatly exceed the figure set in the previous year. Trade sources do not see any great upturn in the market in the first months of the new year.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.12½
S.P. Natural Rubber Black Tube	.16
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.24¾
Natural Rubber Gray Tube	.24¼

Tire Fabrics

Production of high tenacity rayon yarn already has hit an all-time record high in 1953. As of the end of November, output for 1953 totaled 422,000,000 pounds, exceeding total production in 1952 by 9,000,000 pounds, according to the latest statistics released in *Textile Organon*, official organ of the Textile Economics Bureau.

Total production of high tenacity rayon for 1953 appears likely to exceed 450,000,000 pounds, even if there is a slight tapering off in output in December. Output of high tenacity yarn actually fell off in November, continuing a slight but steady decline which began a few months ago. Output was 31,900,000 pounds in November; 35,100,000 in October; 35,900,000 pounds in September and 39,800,000 in August. Total monthly shipments have also declined slowly in this period, slipping from a monthly average of 37,600,000 in the third quarter to 31,200,000 pounds in November.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.71
9.25 oz. (per square yard)	lb.	.66½
11.65 oz. (per square yard)	lb.	.63
8.9 oz. (per square yard)	lb.	.68

Scrap Rubber

Scrap rubber exports in August showed an increase of 856,720 pounds over July's shipments, but the dollar value dropped, according to the U. S. Department of Commerce. August's scrap rubber exports amounted to 2,114,026 pounds valued at $41,643, compared with July's 1,257,306 pounds worth $54,906. Of the August scrap rubber shipments, 818,757 pounds were shipped to Canada, 479,068 pounds to the Netherlands, 217,731 pounds to Spain, and 141,219 pounds to Japan.

There was little activity noted in the scrap rubber market during this past period, with prices all nominal in view of the lack of business. The immediate outlook is not too promising, the trade states, with December business reflecting the general inactivity.

(Prices Delivered Akron)

Mixed tires	ton	13.50
Light colored carcass	lb.	.05
No. 1 peelings	ton	50.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	16.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.11¼
Natural Rubber Black Tubes	lb.	.04¾
Butyl Rubber Tubes	lb.	.02½

Styrene Monomer Starts at Koppers

• Styrene Monomer, which traces its chemical origin to coal, is a basic product at Koppers, for Koppers has been a leader in the coal carbonization industry for many years. Koppers has its own raw materials for Styrene Monomer, thereby assuring a continuity of supply.

Styrene Monomer has found extensive application in the manufacture of polystyrene plastics and synthetic rubbers, including GR-S Rubber for tires and other rubber-styrene copolymers for most commercial rubber applications including hose, shoe soles, floor tiles, and rubber mechanical goods.

It is also used in the manufacture of styrene resins for coating and impregnating porous and fibrous materials, and in the manufacture of polyester laminating resins, styrenated drying oils and styrenated alkyds for paints, enamels and varnishes.

When looking for a dependable source of supply for vital industrial chemicals, it's good business to look to the leaders. Koppers, one of the country's major manufacturers of Styrene Monomer, is prepared to give you the quickest, best service possible, because its producing plant is *centrally* located. Styrene is supplied in tank-car, tank-truck, and 55-gallon drum quantities.

Koppers Chemicals

KOPPERS COMPANY, INC.
Chemical Division, Dept. RA-123,
Pittsburgh 19, Pennsylvania

SALES OFFICES: NEW YORK • BOSTON • PHILADELPHIA • ATLANTA
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CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

DECEMBER 10, 1953

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; l.c.l., less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*For Export Only

The arrangement of this section closely follows the Chemical Section of the 1953-54 RUBBER RED BOOK. Readers are referred to the RUBBER RED BOOK for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)	lb.	.50	.57
A-32	lb.	.66	.80
A-100	lb.	.52	.66
Accelerator No. 8	lb.	—	1.01½
Accelerator—49	lb.	.53	.54
Accelerator—552	lb.	—	2.25
Accelerator—808	lb.	.66	.68
Accelerator—833	lb.	1.17	1.19
Altax	lb.	.48	.50
Ancap *	lb.	.38	.40
Ancatax *	lb.	.48	.50
Ancazate * BU (ET & ME)	lb.	—	1.04
Ancazide * ET	lb.	—	1.04
ME	lb.	—	1.14
Arazate	lb.	—	2.25
Beutene	lb.	.66	.68
Bismate, Rodform	lb.	—	3.00
Butasan	lb.	—	1.04
Butazate	lb.	—	1.04
Butyl Accelerator 21	lb.	—	.89
Butyl Eight	lb.	1.10	1.35
Captax	lb.	.38	.40
C-P-B	lb.	—	1.95
Cumate, Rodform	lb.	—	1.45
Dibenzo G-M-F	lb.	—	2.60
Diorthotolylguanidine	lb.	.57	.58
Diphenylguanidine	lb.	.48	.49
El-Sixty	lb.	.50	.57
Ethasan	lb.	—	1.04
Ethazate	lb.	—	1.04
Ethyl Thiurad	lb.	—	1.04
Ethyl Tuex	lb.	—	1.04
Ethylac	lb.	.93	.95
G-M-F	lb.	—	2.60
Guantal	lb.	.57	.64
Harvex	lb.	.62	.68
Hepteen	lb.	.44	.46
Base	lb.	—	1.85
Kure-Blend MT	lb.	—	.70
Ledate, Rodform	lb.	—	1.04
MBT-XXX	lb.	.49	.51
Merac	gal.	.75	1.05
Mercaptobenzothiazole	lb.	.38	.40
Mercaptobenzothiazyl Disulfide	lb.	.48	.50
Mertax	lb.	.49	.56
Methasan	lb.	—	1.04
Methazate	lb.	—	1.04
Monex	lb.	—	1.14
Mono Thiurad	lb.	—	1.14
Morfex	lb.	.65	.67
2-MT	lb.	—	.77½
NA-22 (for neoprene)	lb.	—	1.50
NOBS No. 1	lb.	.69	.71
O-X-A-F	lb.	.49	.51
Pentex	lb.	—	1.04
Flour	lb.	—	.21
Permalux (for neoprene)	lb.	—	2.17
Phenex	lb.	.52	.57
Pip-Pip	lb.	—	2.25
R-2 Crystals	lb.	—	2.45
Rotax	lb.	.49	.51
RZ-50	lb.	—	1.00
B	lb.	—	1.00
SA 52	lb.	—	1.14
SA 57	lb.	—	1.04
SA 62	lb.	—	1.04
SA 66	lb.	—	2.50
SA 67	lb.	—	1.04
SA 77	lb.	—	1.04
Santocure	lb.	.69	.76
Selenac (Ethyl, Methyl)	lb.	—	2.50
Setsit-5	lb.	.75	1.05
SPDX-GH	lb.	.64	.69
GL	lb.	—	.95
Tellurac	lb.	—	1.45
Tepidone	lb.	.45	.48
Tetrone A	lb.	—	1.91
Thiofide	lb.	.48	.55
S	lb.	.51	.58
Thionex	lb.	—	1.14
Thiotax	lb.	.38	.45
Thiurad	lb.	—	1.14
Thiuram E	lb.	—	1.04
M	lb.	—	1.14
Trimene	lb.	.56	.58
Base	lb.	1.03	1.06
Tuads, Ethyl	lb.	—	1.04
Tuads, Methyl	lb.	—	1.14
Tuex	lb.	—	1.14
Ultex	lb.	1.00	1.10
Unads	lb.	—	1.13½
Vulcacure NB	lb.	—	.45
ZB	lb.	—	.85
ZE	lb.	—	.85
ZM	lb.	—	.85
Z-B-X	lb.	—	2.45
Zenite	lb.	.48	.50
A	lb.	.57	.59
Zenite Special	lb.	.49	.51
Zetax (uncoated)	lb.	.49	.51
Zimate, Butyl	lb.	—	1.04
Zimate, Ethyl	lb.	—	1.04
Zimate, Methyl	lb.	—	1.04

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.14¾	.15¾
Fish Oil, Hydrogenated, Fatty Acid			
Hydrofol Acid (dlvd.)	lb.	.11	.16½
Hyfac 430 (dlvd.)	lb.	.14¾	.16½
Neo-Fat H.F.O. (dlvd.)	lb.	.14½	.15¾
Stearex Beads (dlvd.)	lb.	.09	.10¼
Lime, Hydrated			
Arrowhead	ton	—	20.50
Marblehead	ton	—	16.00
Sierra	ton	—	22.00
Litharge			
Eagle-Picher	lb.	—	.16
SB (dlvd.)	lb.	—	.16
Magnesium Oxide, Heavy			
General Magnesite 500	lb.	.05	.06½
600	lb.	.06	.08
Michigan No. 15	lb.	.06	.06½
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	—	.31
General Magnesite (Neoprene Grade)	lb.	—	.30
General Magnesite No. 101	lb.	—	.19½
Genmag ML	lb.	—	.25
K & M (Neoprene Grade)	lb.	.30	.31
Maglite D	lb.	—	.25
M	lb.	—	.31
Marine's (Neoprene Grade) (l.c.l.)	lb.	—	.30
Michigan No. 30	lb.	—	.25
No. 40 Extra Light	lb.	—	.31
Witco Extra Light	lb.	.32	.35
Oleic Acid			
Emersol 210 (dlvd.)	lb.	.14	.15¾
L.C.P. Red Oil	lb.	.13¾	.15½
Neo-Fat 90-14	lb.	—	.14
92-04	lb.	—	.13½

ACTIVATORS (Cont'd)

Palm Oil Fatty Acid (c.l.)	lb.	.10½	.14
Potassium Oleate (dms.)	lb.	.45	.55
Red Lead			
Eagle-Picher	lb.	—	.17
No. 2 RM (dlvd.)	lb.	—	.17
Sodium Laurate, 75%	lb.	.64	.74
Sodium Oleate, 75%	lb.	.45	.55
Paste (dms.)	lb.	—	.20
Sodium Stearate, 75%	lb.	.45	.55
USP Grade (drums)	lb.	—	.37
Stearic Acid, Single Pressed			
Emersol 110 (dlvd.)	lb.	.12¼	.14
Groco 53	lb.	.12½	.14
Neo-Fat 18-53	lb.	.11¼	.13
Wochem 730	lb.	.10¾	.11¾
Stearex B (dlvd.)	lb.	.15¼	.16¾
Stearic Acid, Double Pressed			
Groco 54	lb.	.12¾	.14½
Neo-Fat 18-54	lb.	.11¾	.14½
Wochem 731	lb.	.12¼	.13¾
Stearic Acid, Other			
Neo-Fat 1-58	lb.	.1190	.1318
1-60	lb.	.1408	.1525
1-65	lb.	.1450	.1575
Wochem 732	lb.	.14½	.15½
White Lead Basic Carbonate	lb.	.16	.17
White Lead Basic Sulfate	lb.	.14¾	.15¾
Zinc Laurate			
Laurex	lb.	.30	.31
Zinc Stearate	lb.	.39	.41
Aquazinc	lb.	.20	.35

Unclassified Activators

Actifat (dms.)	lb.	—	.18
Actogen	lb.	—	.62
Aktone	lb.	.22	.23
Barak	lb.	—	.62
Curade	lb.	.57	.59
D-B-A	lb.	—	1.95
Dibutylamine (dlvd.)	lb.	.55	.56
MODX	lb.	.295	.345
Polyac	lb.	—	1.65
Ridacto (drums)	lb.	.25	.26
Snodette (dlvd.)	lb.	.16¼	.18¾
Vulklor	lb.	.75	.85

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.17	.21
Aqua Ammonia (dms.)	lb.	.031	.035
M.B.M. (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	—	.20
Regular	lb.	—	.12
D.C. Antifoam A	lb.	5.45	6.65
Antifoam A Emulsion	lb.	2.05	4.00
Antifoam AF Emulsion	lb.	2.05	2.85
Defoamer A-25	lb.	—	3.00
Deltyl Prime	lb.	.70	.80
Defoamer 630	lb.	—	.12½
Emcol IM	lb.	—	.60
Kessco X-3 (dms.)	lb.	—	.44
RS-968	lb.	.38	.38½
SS-24	lb.	5.80	6.90
66	lb.	5.70	6.20
Terpinol Prime No. 1	lb.	.35	.50

ANTIOXIDANTS

Agebest 1293-22A	lb.	1.90	2.00
Agerite Alba	lb.	2.35	2.45
Gel	lb.	.64	.66
Hipar	lb.	.98	1.00
H. P.	lb.	.72	.74
Powder	lb.	.52	.54
Resin	lb.	.75	.77
Resin D	lb.	.52	.54
Stalite	lb.	.52	.54
White	lb.	1.45	1.55
Akroflex C	lb.	.77	.79
CD	lb.	.72	.74
Aminox	lb.	.52	.54
Antioxidant 2246	lb.	1.65	1.68
Antox	lb.	.52	.54
Aranox	lb.	—	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.80	.82
B-L-E	lb.	.52	.54
B-X-A	lb.	.52	.54
Deenax	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.91	.95
Eugenol C-95%	lb.	2.30	2.50
Flectol H	lb.	.52	.59
Flexamine	lb.	.72	.74
Neozone A	lb.	.56	.58
C	lb.	—	.69½
D	lb.	.52	.54

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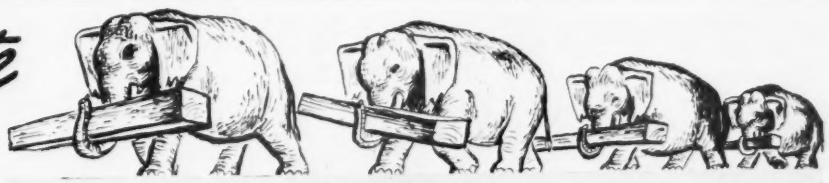

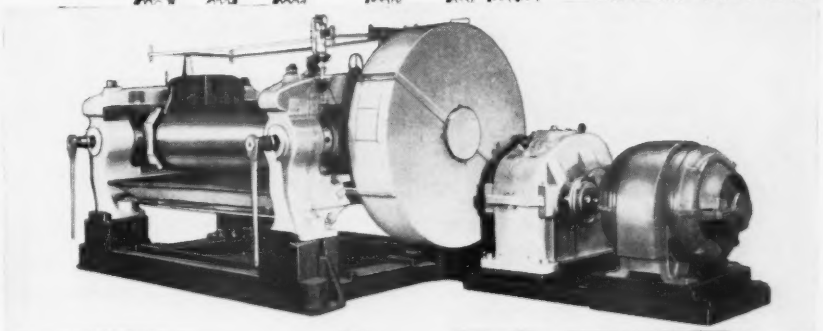

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HYDRAULIC PRESSES • PUMP UNITS
BALE SLITTERS • SPEED REDUCERS

ANTIOXIDANTS (Cont'd)

Octamine	lb.	.52	.54
Oxidex	lb.	—	3.60
PDA-10	lb.	.39	.41
Permalux	lb.	—	2.17
Polygard	lb.	.52	.54
Santoflex AW	lb.	.78	.85
B	lb.	.52	.59
BX	lb.	.63	.70
35	lb.	.72	.79
Santovar-A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.60	1.67
Santowhite L	lb.	.52	.59
MK	lb.	1.29	1.36
Sequestrene AA	lb.	—	1.00
NA2	lb.	—	.82
NA3	lb.	—	.80
Stabilite	lb.	.55	.57
Alba	lb.	.72	.77
L	lb.	.60	.62
White	lb.	.53	.55
White Powder	lb.	.41	.43
Stabilizer No. 1	lb.	1.55	1.80
Stabilizer No. 9-A	lb.	.80	1.05
Styphen I	lb.	.51	.55
Sunolite	lb.	.21	.23
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A	lb.	.98	1.00
V-G-B	lb.	.70	.72
Wing-Stay S	lb.	.51	.52

ANTI-SCORCHING AGENTS

Armeen HT	lb.	.34	.42
Benzoic Acid—Tech.	lb.	—	.43
Good-rite Vultrol	lb.	.62	.64
Harcopol 1183	lb.	.70	.74
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

Arquad S	lb.	.22	.25
Formaldehyde (dms.)	lb.	.066	.071
G-4 (bbls.)	lb.	1.04	1.19
G-11	lb.	2.20	2.30
Nuodex 100 S.S. (dlvd.)	lb.	—	1.10
Nuodex 100 W.D. (dlvd.)	lb.	—	1.25
Nuodex Zinc 8% (dms.) (dlvd.)	lb.	.24	.28
Ortho Cresol (26°-27°)	lb.	—	.201
Preventol GD	lb.	—	1.04
I	lb.	—	.80
Retarder D	lb.	.42	.50
Soligen Drier—Copper 8% (dms.)	lb.	.20¼	.21½
Zinc 8% (dms.)	lb.	.22¼	.23½
Vancide	lb.	—	.80

ANTI-WEEBING AGENTS (for Latex)

DC 7 Compound	lb.	5.13	6.50
Webnix 34	lb.	1.50	2.25

AROMATICS (DEODORANTS)

Airkem 115	gal.	—	6.50
122	gal.	—	6.50
186	gal.	—	6.50
Alamask AA	lb.	—	3.00
AD	lb.	—	2.00
AF	lb.	—	2.50
AO	lb.	—	1.50
AR	lb.	—	.50
BG	lb.	—	1.15
BGM	lb.	—	.60
BW	lb.	—	1.85
BWM	lb.	—	2.00
CY	lb.	—	2.40
DL	lb.	—	1.95
H	lb.	—	5.50
LD	lb.	—	.75
LF	lb.	—	4.90
ND	lb.	—	2.75
O	lb.	—	6.50
OS	lb.	—	5.25
Bouquet 149	lb.	—	3.00
Coumarin	lb.	2.95	3.00
Coveral AS	lb.	—	1.20
Curodex 19	lb.	4.75	4.90
188	lb.	5.75	5.90
198	lb.	6.75	6.90
Deodorant 65	lb.	—	1.85
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Deodorant Oil GD 3427	lb.	1.70	2.00
GD 6422	lb.	2.00	2.50
GD 6423	lb.	1.60	1.90
GD 6575	lb.	2.40	2.90
GD 31063	lb.	2.25	2.75
Latex Perfume 5	lb.	—	3.25
6	lb.	—	7.50
9	lb.	—	.65
Naugaromes (dms.)	lb.	.60	3.00
Neutroleum Delta	lb.	—	2.60
Gamma	lb.	—	3.60
Parador A	lb.	2.00	2.50
C	lb.	2.75	3.25
E	lb.	.25	.55
GD 5280	lb.	2.00	2.50
GD 5348	lb.	1.90	3.25

AROMATICS (Cont'd)

Perfume Oil Bouquet Vanilla M	lb.	2.40	2.75
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
Rubbarome (dms.)	lb.	.60	3.80
Rubber Perfume 12	lb.	—	2.85
Russian Leather 7	lb.	—	4.35
Vanillin	lb.	3.00	3.05

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	—	8.00
Blowing Agent CP-975	lb.	.32	.35
Celogen	lb.	—	1.95
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	2.30
Sponge Paste	lb.	—	.20
Unicel	lb.	—	.90
ND	lb.	—	.79
S	lb	—	.20
Urea	lb.	.04¼	.04¾

BONDING AGENTS

Braze	gal.	6.00	7.50
Durez 12987	lb.	.48	.53
Kalabond	gal.	6.50	7.75
MDI (dms.)	lb.	3.45	3.75
50 (dms.)	lb.	1.85	2.15
Penacolite B1A	lb.	—	.95
R-2710	lb.	—	.95
Pliobond 20	gal.	2.91	4.23
30	gal.	3.65	4.97
Rex Compounds	gal.	1.30	2.85
TDI (dms.)	lb.	2.00	2.30
Thixons	gal.	3.30	9.00
Ty-Ply Q (BN & S)	gal.	6.75	8.00
Tygobond 30	gal.	5.50	7.45

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Crystals	lb.	.07	.11½
Hydroxyacetic Acid—70% (dms.)	lb.	—	.084
Zinc Nitrate, Tech.	lb.	—	.22½

COLORING AGENTS

Black

Aquablak B (also M, R)	lb.	.08½	.11¾
Aquablak S	lb.	.11½	.12
Black Shield 4-35 (dms.)	lb.	—	.09
Carbon Black—See *Reinforcing Agents*			
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lb. bags)	lb.	.12¾	.13
Pure Black Iron Oxide	cwt.	12.75	13.00

Blue

Blue GD, Dispersed	lb.	—	4.55
Cooke M.B. Blue	lb.	2.45	2.85
Mitori Blue	lb.	—	.48
Monastral Fast Blue CPL	lb.	—	1.77
PCD, Dispersed	lb.	—	2.50
Peacoline Blue	lb.	—	3.85
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	—	1.70
Syntheline Blue	lb.	—	3.85
Stan-Tone MBS	lb.	1.55	4.55
GPE	lb.	—	2.50
LPC	lb.	—	4.05
PC	lb.	—	2.40
PDS	lb.	—	2.00
Ultramarine	lb.	.14	.30
Vansul Blue M.B.	lb.	.90	2.65

Brown

Brown Iron Oxide	lb.	.13¾	.14
Mapico Brown (50 lb. bags)	lb.	.13¾	.14

Green

Cooke M.B. Green	lb.	1.45	3.20
Filo Green	lb.	—	.32
Green Chromium Oxide, Pure	lb.	—	.39¾
Green Chromium Oxide, Pure Hydrated	lb.	1.00	1.10
Green FD, Dispersed	lb.	—	2.05
Monastral Fast Green GSD Dispersed	lb.	—	3.20
GSL	lb.	—	1.97
Permansa Green CP-594	lb.	—	1.35
Pigment Green B	lb.	—	1.35
GL-652D	lb.	.80	.85
Ramapo Green	lb.	—	4.00
Rubber Green X-1292	lb.	—	1.30
Stan-Tone MBS	lb.	1.75	3.60
GPE	lb.	—	3.00
LPC	lb.	—	4.60
PC	lb.	—	3.00
PDS	lb.	1.90	2.20
Vansul Green M.B.	lb.	1.05	3.05

COLORING AGENTS (Cont'd)

Maroon

Stan-Tone MBS	lb.	—	3.50
LPC	lb.	—	2.90
Vansul Maroon M.B.	lb.	1.05	2.80

Orange

Molybdate Orange	lb.	—	.44
Orange OD, Dispersed	lb.	—	2.75
Rubber Orange X-2065	lb.	—	3.00
Stan-Tone GPE	lb.	—	1.20
LPC	lb.	.70	3.35
PC	lb.	—	1.05
PDS	lb.	—	1.20
Vansul Orange M.B.	lb.	2.25	2.60

Red

Antimony Trisulfide	lb.	.72	.78
R. M. P. Sulfur Free	lb.	—	.78
R. M. P. No. 3	lb.	—	.72
Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.75	2.00
Cooke M.B. Red	lb.	.95	3.15
Graphic Red (dlvd.)	lb.	—	.79
Indian Red, American, Pure	lb.	.12¾	.13
Doxco (English)	lb.	.11½	.11¾
Kroma Reds	lb.	.16¼	.21¼
Mapico Reds (50 lb. bags)	lb.	.12¾	.13
Oximony Iron Oxide	lb.	—	.09
Red Iron Oxide, Light	lb.	.12¾	.13
Red PBD, Dispersed	lb.	—	1.75
2BD, Dispersed	lb.	—	1.80
2BL	lb.	—	1.47
PBL	lb.	—	1.65
Rubanox Red CP-762 (dlvd.)	lb.	—	1.40
Rubber Red CP-339 (dlvd.)	lb.	—	1.10
Rubber Red X-1148	lb.	—	.79
Solfast Red	lb.	1.50	1.95
Stan-Tone MBS	lb.	1.20	4.00
GPE	lb.	1.65	2.00
LPC	lb.	1.05	2.20
PC	lb.	1.45	2.40
PDS	lb.	1.40	1.55
Sun Burnt Red	lb.	.11½	.11¾
Vansul Red M.B.	lb.	.95	3.40
Watchung Red	lb.	1.65	2.00

White—Lithopone

Albalith	lb.	.0750	.0825
Eagle-Picher	lb.	.0750	.0825
Permolith	lb.	.0750	.0825
Ponolith	lb.	.0750	.0825
Sunolith	lb.	.0750	.0825

White—Titanium Pigments

Ti-Cal	lb.	.08⅜	.09⅛
Ti-Pure	lb.	.22½	.25½
Titanox A—all grades (dlvd.)	lb.	.22½	.23½
RA (dlvd.)	lb.	.24½	.25½
RA-10 (dlvd.)	lb	.24½	.25½
RA-NC (dlvd.)	lb.	.24½	.25½
RC (dlvd.)	lb.	.08⅝	.09⅛
RC-HT (dlvd.)	lb.	.08⅜	.08⅞
Unitane O-220	lb.	.19½	.20½
OR-250	lb.	.21½	.22½
Zopaque	lb.	.22½	.23½
R	lb.	.24½	.25½

White—Zinc Oxide (American Process)

AZO ZZZ 11 (and 22, 33, 44, 55)	lb.	.1350	.1450
Eagle-Picher AAA	lb.	.1400	.1500
Horse Head Special	lb.	.1350	.1450
XX	lb.	.1350	.1450
Protox 166	lb.	.1350	.1450
167	lb.	.1350	.1450
St. Joe Black Label	lb.	.1350	.1450
Green Label	lb.	.1350	.1450
Red Label	lb.	.1350	.1450

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	13

White—Zinc Oxide (French Process)

Florence Green Seal	lb.	.1525	.1625
Red Seal	lb.	.1475	.1575
White Seal	lb.	.1575	.1675
Kadox 25	lb.	.1575	.1675
Kadox 15, 17 and 72	lb.	.1350	.1450
Protox 168	lb.	.1350	.1450
169	lb.	.1350	.1450
U. S. P.	lb.	.1675	.1775

White—Zinc Sulfide

Cryptone ZS	lb.	.2530	.2630

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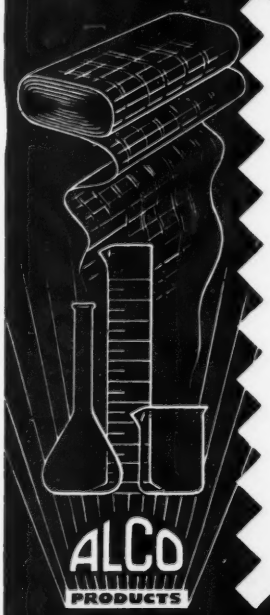

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COLORING AGENTS (Cont'd)

Yellow

Benzidine Yellow	lb.	2.50	- 3.50
Cadmolith Yellow (bbls.)	lb.	——	- 1.20
Chrome Yellow	lb.	——	- .31
Cooke M.B. Yellow 405	lb.	——	- 1.70
Iron Oxide, Pure	lb.	.10½	- .10¾
Mapico Yellow (50 lb. bags)	lb.	.10½	- .10¾
Rubber Yellow X-1940	lb.	——	- 2.15
Stan-Tone MBS	lb.	1.30	- 4.50
GPE	lb.	——	- 4.50
LPC	lb.	——	- 2.25
PC	lb.	.85	- 4.50
PDS	lb.	1.25	- 1.75
Toluidine Yellow YL-660 D	lb.	1.15	- 1.20
Oximony Iron Oxide	lb.	——	- .06¾
Vansul Yellow M.B.	lb.	1.05	- 1.85
Yellow GD, Dispersed	lb.	——	- 2.15
GL	lb.	——	- 1.80
Zinc Yellow	lb.	——	- .25

DISPERSING AGENTS

Anchoid*	lb.	.24	- .25
Armeen 18	lb.	.42	- .50
Blancol	lb.	——	- .15¾
Darvan No. 1 (and No. 2)	lb.	.22	- .30
Daxad 11 (21, 23)	lb.	.08	- .30
Dispersaid	lb.	1.25	- 1.35
Emcol K-8300 (dms.)	lb.	.19	- .20
Emulphor ON-870	lb.	——	- .61
Furala	lb.	.06½	- .07½
Halloid	lb.	.04½	- .05½
Igepal CO-630	lb.	——	- .36
Igepon T-73	lb.	——	- .29½
Leonil SA	lb.	——	- .55
Lomar PW	lb.	——	- .16
Marasperse C	lb.	.06½	- .06¾
CB	lb.	.12¼	- .13¼
N	lb.	.09½	- .10½
Nekal BA-75	lb.	——	- .40
BX-76	lb.	——	- .64
Rubbex	lb.	.267	- .285
Stablex B	lb.	.50	- .95
Stan-Chem BQC	lb.	.12¼	- .17¾
1067	lb.	——	- .13½
1471	lb.	.1687	- .2187
2251	lb.	.12¼	- .17¾
Trenamine D-25	lb.	.32½	- .36
Triethanolamine (drums) (dlvd.)	lb.	.24¼	- .27¼
Yelkin TT	lb.	.13	- .17
Zinsper	lb.	——	- .15

EXTENDERS

Advagum 1098	lb.	——	- .64
Arcco 1071-13B	lb.	.14½	- .15½
1073-18B	lb.	.13½	- .14½
1294-36B	lb.	.11½	- .12½
Bunaweld Polymer No. 780	lb.	——	- .22
No. 5514	lb.	——	- .35
Car-Bel-Ex-A and B	lb.	——	- .14
Extender 600	lb.	——	- .1480
Nopco 2271	lb.	.15½	- .16½
Polyco 418	lb.	.17	- .18
PR-162 Latex Extender	gal.	——	- 1.55
Synprolac	lb.	.16	- .23
Synprowax	lb.	——	- .23
Vistanex	lb.	——	- .45

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite	lb.	.20	- 1.33
Lionite	lb.	.14½	- 1.25
Pumice	lb.	.03	- .05
Aluminum Hydrate	lb.	.07	- .10
Aluminum Silicate			
Marter White	ton	18.50	- 30.00
Barium Carbonate (l.c.l.)	ton	95.50	-100.00
Barytes			
No. 1 Floated, White	ton	41.35	- 60.10
No. 2 Floated, Un-bleached	ton	39.35	- 58.10
No. 22 Barytes (c.l.)	ton	——	- 25.00
Foam A	ton	——	- 41.35
XIOR	ton	75.00	- 80.00
Bentonite (c.l.)	ton	——	- 13.50
Argosite Clay (c.l.)	ton	——	- 12.50
Bennett Clay (c.l.)	ton	——	- 32.50
SPV Volclay (c.l.)	ton	——	- 12.50
White Hi-Gel	ton	——	- 65.90
Blanc Fixe	ton	72.50	-120.00
Calcium Carbonate			
Atomite (c.l.)	ton	——	- 30.00
B.I. White No. 1 (c.l.)	ton	——	- 8.00
B.I. White No. 2 (c.l.)	ton	——	- 7.50
B.I. White No. 390	ton	——	- 6.25
Blue Star XX	ton	——	- 15.50
Calcene NC	ton	72.50	- 92.50
TM	ton	75.00	- 95.00
Calwhite	ton	——	- 17.00
Camel-Carb	ton	——	- 10.00
Camel-Tex	ton	——	- 18.00
Camel-Wite	ton	——	- 30.00
Duramite	ton	——	- 15.00
Gamaco	ton	——	- 30.00
Kalite	ton	50.00	- 65.00
Keystone White	ton	——	- 16.00
Laminar	ton	——	- 30.00
Lesamite (c.l.)	ton	——	- 27.50

FILLERS (Cont'd)

Calcium Carbonate (Cont'd)			
Lorite	ton	30.00	- 35.00
Millical	ton	35.00	- 50.00
Multifex	ton	140.00	-155.00
MM	ton	110.00	-125.00
Non-Fer-Al	ton	30.00	- 45.00
Purecal M	ton	56.75	- 80.75
SC	ton	110.00	-125.00
T	ton	110.00	-125.00
U	ton	120.00	-135.00
Rambo No. 1	ton	——	- 8.50
Sierracal	ton	15.00	- 18.50
Snowflake	ton	17.00	- 18.00
Super Multifex	ton	160.00	-175.00
Surfex	ton	35.00	- 50.00
Suspenso	ton	33.00	- 48.00
Witcarb Reg.	ton	56.75	- 80.75
P	ton	110.00	-125.00
R	ton	120.00	-135.00
RC	ton	110.00	-125.00
York White	ton	——	- 9.50
Calcium Silicate			
Silene EF	ton	120.00	-140.00
Calcium Sulfate, Anhydrous			
Snow White Filler	ton	——	- 20.50
Calcium Sulfate, Hydrous			
Terra Alba No. 1	ton	12.00	- 14.40
Chalk Whiting (l.c.l.)	lb.	.0150	- .0175
Recco Paris Whiting	ton	——	- 33.00
Clay			
Aiken Clay	ton	——	- 14.00
Alsilite (c.l.)	ton	20.00	- 45.00
Alsite (c.l.)	ton	——	- 14.00
Aluminum Flake	ton	23.50	- 30.00
Buca (c.l.)	ton	——	- 45.00
Burgess No. 20	ton	——	- 35.00
No. 30	ton	——	- 37.00
Burgess Iceberg	ton	——	- 50.00
Catalpo (c.l.)	ton	——	- 35.00
Champion	ton	——	- 14.00
C.S.D. (c.l.)	ton	——	- 13.50
Crown	ton	——	- 14.00
Dixie (c.l.)	ton	——	- 14.00
Franklin Clay (c.l.)	ton	——	- 13.50
Harwick Clays	ton	15.50	- 50.00
Hi-White R	ton	——	- 13.50
Kaolloid Clay (c.l.)	ton	——	- 10.50
McNamee (c.l.)	ton	——	- 13.50
Paragon	ton	——	- 13.50
Pigment 5	ton	23.50	- 26.50
Pigment 33	ton	——	- 37.00
Recco (c.l.)	ton	——	- 14.00
Snobrite	ton	——	- 12.50
Suprex	ton	——	- 14.00
Whitetex (c.l.)	ton	——	- 50.00
Windsor Clay (c.l.)	ton	——	- 14.00
Diatomaceous Earth	ton	30.00	- 50.00
Kaylorite (c.l.)	ton	——	- 30.00
Lorite	ton	——	- 30.00
Flock			
Cotton, white and colored	lb.	.13	- .32
Filfloc F 40-9000	lb.	——	- .16
Filfloc F 6000	lb.	——	- .40
Polycel	ton	110.00	-210.00
Rayon, bleached or dyed	lb.	.82	- 1.25
Rayon, grey	lb.	——	- .18
Rayon, pink	lb.	——	- .18
Solka-Floc (l.c.l.)	lb.	.07	- .16
Glue, Bone (dlvd.)	lb.	.18	- .20½
Leather, Shredded	lb.	.05	- .17
Lignin	lb.	.03	- .06
Indulin	lb.	.06	- .08
Limestone, Pulverized	ton	3.00	- 4.75
Georgia Marble No. 10	ton	——	- 10.00
Industrial Filler No. 100	ton	——	- 5.75
Micro Velva	ton	49.00	- 51.00
Velvet Filler, Superfine	ton	——	- 30.00
Magnesium Carbonate	lb.	.0950	- .1050
K & M Clearcarb	lb.	.1225	- .1275
Magnesium Oxide	lb.	.05	- .06
Magnesium Silicate (see Talc)			
Mica	lb.	.01¾	- .07¾
Concord	lb.	.07½	- .08¼
Micro-Mica	lb.	.07½	- .08¼
Mineralite (c.l.)	ton	30.00	- 85.00
Silversheen	lb.	.07½	- .08¼
Triple A Mica (c.l.)	ton	——	- 25.00
Vermiculite	lb.	——	- .11
Wet Ground Biotite Mica	lb.	.06¾	- .07
Wet Ground Mica No. 160	lb.	.07½	- .08¼
Pyrophyllite			
No. 261	ton	——	- 11.50
Pyrax A (c.l.)	ton	——	- 13.50
WA (c.l.)	ton	——	- 16.00
Sawdust, Graded	ton	14.00	- 35.00
Silica	ton	16.00	- 27.00
Blue Star	ton	——	- 20.60
Slate, Powdered (l.c.l.)	ton	15.00	- 20.00
Lo-Micron Slate Flour	lb.	——	- .04½
No. 133 Slate Flour	ton	——	- 4.55
Talc (Magnesium Silicate)			
Asbestol Regular	ton	——	- 25.00
Blue Star	ton	——	- 23.00
French	ton	——	- 59.00
L. S. Silver	ton	29.25	- 34.25
No. 367	ton	——	- 13.00
No. 1600	ton	——	- 70.60
No. 1768	ton	——	- 13.00
Nytal 200	ton	——	- 25.00
300	ton	——	- 36.00
Sierra White	ton	25.75	- 30.75
Soapstone	ton	——	- 13.00

FILLERS (Cont'd)

Walnut Shell Flour	ton	45.00	-115.00
Stan-Shell	ton	63.00	-126.00
Whiting, Commercial	ton	——	- 7.00
Camel-Carb	ton	——	- 10.00
C-C-O White	ton	——	- 19.00
Georgia Marble No. 15	ton	——	- 15.00
No. 16	ton	——	- 16.00
Keystone (c.l.)	ton	——	- 16.00
Snowflake (c.l.)	ton	17.00	- 18.00
Stan-White 325	ton	8.50	- 11.10
Veroc (c.l.)	ton	——	- 8.50
Welco (c.l.)	ton	——	- 8.50
York White R (c.l.)	ton	——	- 8.50
Wood Flour	ton	24.00	- 48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	2.10	- 2.35
Black Out	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.40	- .50
VanWax	gal.	1.45	- 1.50

FLAME RETARDANTS

Chlorowax 70	lb.	.18	- .19
Halowax	lb.	.35½	- .61½
Zinc Borate 3167	lb.	.1920	- .2020
Zyrox	lb.	.76½	- .86½

LUBRICANTS, MOLD

Akro Gel	lb.	——	- .165
Alipal CO-433	lb.	——	- .21
CO-436	lb.	——	- .30
Aquadag	lb.	3.50	- 4.00
Aquarex D	lb.	——	- .78
L	lb.	——	- .94
ME	lb.	——	- .94
MDL	lb.	——	- .33
WAQ	lb.	——	- .25
Armid O	lb.	.46	- .82
Borax, Granular (l.c.l.)	ton	89.00	- 94.00
Carbowax 4000	lb.	.31	- .32
CD Mold Release A	gal.	——	- 7.00
B	gal.	——	- 5.00
Colite Concentrate (dms.)	gal.	——	- .90
Concentrex	lb.	——	- .25
Dag Dispersions No. 197	lb.	1.85	- 2.65
D.C. 7 Compound	lb.	5.13	- 6.50
D.C. Emulsion No. 7	lb.	1.59	- 2.07
No. 8	lb.	1.46	- 1.98
No. 35	lb.	1.46	- 3.50
No. 35A	lb.	1.46	- 3.50
No. 35B	lb.	1.46	- 3.50
D.C. Mold Release Fluid	lb.	3.70	- 6.00
Dipex	lb.	.14	- .18
Dri-Lube	lb.	——	- .22
Glydag G	lb.	1.30	- 2.00
Hawkeye Flake (dlvd.)	lb.	.08¼	- .10¼
Igepal CO-430	lb.	——	- .39
CO-530	lb.	——	- .39
CO-630	lb.	——	- .36
Igepon AP-78	lb.	——	- .49
T-51	lb.	——	- .13½
Kokobace R	lb.	.17½	- .18½
Lubrex	lb.	.25	- .30
Lubri-Flo	gal.	10.00	- 12.00
Migralube	lb.	——	- .35
Mold Lubricant No. 72			
Conc.	gal.	2.50	- 4.00
No. 735	gal.	1.26	- 2.75
No. 769	gal.	1.20	- 2.60
No. 880	gal.	1.12	- 2.50
No. 856	gal.	2.00	- 4.00
No. 935	gal.	1.75	- 3.25
No. 980	gal.	1.65	- 3.15
Moldeze No. 3	gal.	5.00	- 6.00
Mold-Brite	gal.	——	- 1.50
Mold-Slick	lb.	.253	- .271
Mold-White	gal.	——	- 2.00
Monopole Oil MD	lb.	——	- .18
Olate Flakes	lb.	——	- .16¾
Orvus WA Paste (dms.)	lb.	——	- .25
Polyglycol 15-200	lb.	.25	- .28¾
E4000	lb.	.31	- .37
Prodag	lb.	.28	- .42
Purity Flake (dlvd.)	lb.	.11	- .14
Rubber-Flo	gal.	1.25	- 1.60
Rubber-Glo	gal.	——	- .94
Rusco Mold Paste	lb.	——	- .25
Sericite (l.c.l.)	ton	65.00	- 75.00
SF-92	lb.	3.70	- 4.22
SM-33	lb.	1.50	- 1.68
55	lb.	1.46	- 2.00
61	lb.	1.46	- 1.68
Thermalube	lb.	——	- .13¾
Ucon Lubricants	lb.	.26¾	- .27¾
Ulco Mold Soap	lb.	.12	- .23

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	- .25
Emcol DS-50	lb.	——	- .38
RDH-S	lb.	——	- .27
Extrud-o-Lube	gal.	——	- 1.54
G.B. Naphthenic Neutrals	gal.	.11	- .18
Ivory Chips	lb.	.14½	- .15½
Latex-Lube GR (dlvd.)	lb.	.19¼	- .20
Propylene Stearate (dms.)	lb.	.68	- .78

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LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.37	.42
Calcium Stearate	lb.	.35	.40
D.C. 4 Compound	lb.	5.13	6.50
D.C. 200 Fluid	lb.	3.70	6.00
Glycerized Lubricant	gal.	—	1.48
Glydag G	lb.	1.50	2.10
Hydro-Zinc	lb.	—	.20
Latex-Lube Pigmented (dlvd.)	lb.	.17¾	.18¾
R-66 (dlvd.)	lb.	—	.16½
Liqui-Lube (dlvd.)	lb.	—	.16¼
N.F. (dlvd.)	lb.	—	.16¾
N.T. (dlvd.)	lb.	—	.16¾
Polyethylene Glycol	lb.	.26½	.29
Rexanol	lb.	—	.13
Separex	lb.	—	.25
Stock-Lube	lb.	—	.19
Slab-Dip	lb.	—	.15
Wet-Zinc	lb.	—	.22¼
Zinc Stearate	lb.	.39	.41
Z.S.D. Dispersion	lb.	—	.20

MOLD CLEANERS

Actusol (dlvd.)	gal.	1.45	1.65
Alkon (dlvd.)	lb.	.16	.16½
Metso Anhydrous	cwt.	4.85	7.10
Metso 99	cwt.	4.50	6.75
Metso 200	cwt.	6.00	6.75
Metso Granular	cwt.	4.00	6.25
Orvus Extra Granules	lb.	.20½	.21½
Rubber-Sol	gal.	2.97	3.97
Sprex A.C. (dlvd.)	lb.	.17¾	.18¾

PEPTIZING AGENTS

Peptizer P-12	lb.	.95	1.25
Pepton 22 Plasticizer	lb.	.79	.82
RPA 2	lb.	—	.78
3	lb.	—	.47
3 Conc.	lb.	—	.97
5	lb.	—	.59
6	lb.	—	1.58

PLASTICIZERS & SOFTENERS

AA (dms.)	lb.	—	.20½
Acto 500	lb.	—	.09
Adipol BCA (dms.)	lb.	.46¾	.47¼
2EH	lb.	.46¾	.47¾
10A	lb.	.46¾	.47¾
ODY	lb.	.53¾	.54¾
American Pine Tar	lb.	.0410	.0678
Arneel	lb.	.22	.27
Arolene 1980 (c.l.)	lb.	—	.10
Aromatic Plasticizer 10 (and 25)	lb.	—	.05
Aromatic Tar	gal.	.0573	.1973
Bardol	lb.	.02¾	.03¾
B	lb.	.06¼	.06½
Bayol D	gal.	—	.382
F	gal.	—	.52
Beeswax, Bleached	lb.	.70	.75
Yellow Refined	lb.	.57	.62
Bondogen	lb.	.55	.60
B.R.C. No. 20	lb.	.0150	.0175
B.R.H. 2	lb.	.0213	.0351
BRS 700	lb.	.02	.0285
B.R.T. 3	lb.	.0180	.0265
4	lb.	.0250	.0260
7	lb.	.03	.031
B.R.V.	lb.	.0475	.0565
Bunarex Resins	lb.	.06½	.07½
Bunatak AH	lb.	.08	.09
U	lb.	—	.17½
No 90	lb.	—	.09
No. 210	lb.	—	.14
Burgundy Pitch	lb.	.0843	.0888
Butac	lb.	.11¾	.12¾
Butoxyethyl Diglycol Carbonate	lb.	.40	.41
Butyl Benzyl Sebacate	lb.	.87	.89¾
Butyl Carbitol Perlargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Perlargonate (dms.)	lb.	—	.68
Butyl Palmitate	lb.	—	.26½
Butyl Roleate	lb.	.176	.18
Butyl Stearate (dms.)	lb.	.24½	.26
BWH-1	lb.	.16	.17
Cabflex DDA (dms.)	lb.	.50¾	.51¾
DDP (dms.)	lb.	.39¾	.40¾
Di-BA (dms.)	lb.	.45¼	.46¼
Di-OA (dms.)	lb.	.46¾	.47¾
Di-OP (dms.)	lb.	.36¾	.37¾
Di-OZ (dms.)	lb.	.53¾	.54¾
Cabol 100	lb.	.04	.07
Califlux 510, 550	lb.	.02½	.03¼
G.P.	lb.	.0125	.02
R-100	lb.	.04½	.05¼
TT	lb.	.0170	.0245
Candelilla Wax, Prime	lb.	.74	.77
Capryl Benzyl Sebacate	lb.	.89	.91¾
Carbowax 4000 (dms.)	lb.	.31	.32
Cardolite 615	lb.	.33¼	.36¾
816	lb.	.25¾	.28¾
Carnauba Wax, Crude	lb.	1.00	1.10
Refined	lb.	1.05	1.10
Yellow	lb.	1.30	1.35
Castorwax	lb.	.3260	.3380
Celluflex (dms.)	lb.	.35	.40
Ceresine Wax	lb.	.14	.26
Chlorowax 40	lb.	.14½	.15½
CTLA Polymer	gal.	.20	.36
Cumar Resins	lb.	.06½	.17
Darex DBP	lb.	.34	.36¾
DOP	lb.	.35	.37¾
DIOP	lb.	.35	.37¾
D.B.M.	lb.	—	.30
Degras, Common	lb.	—	.16

PLASTICIZERS & SOFTENERS (Cont'd)

Diallyl Phthalate (dms.)	lb.	.51½	.52¼
Dibenzyl Sebacate	lb.	.88	.90¾
Dibutoxethyl Sebacate	lb.	—	.5634
Dibutyl Phthalate	lb.	.34	.37
Dibutyl Sebacate	lb.	.80	.82½
Dicapryl Adipate	lb.	.41	.43¾
Dicapryl Phthalate	lb.	.34¾	.35¾
Dicapryl Sebacate	lb.	.66½	.69¼
Di-Carbitol Phthalate (dms.)	lb.	.42	.42½
Dicyclohexyl Phthalate	lb.	.59	.59
Diethyl Phthalate (t.c.)	lb.	.25	.27¾
Di-2-ethylhexyl Phthalate (t.c.)	lb.	—	.35
Dihexyl Adipate	lb.	.39	.41¾
Dihexyl Phthalate	lb.	.35	.37¾
Dihexyl Sebacate	lb.	.72	.74¾
Diisobutyl Azelate	lb.	—	.47¾
Di-iso-octyl Adipate (dms.)	lb.	—	.47¾
Di-iso-octyl Phthalate (t.c.)	lb.	.35	.37¾
Dimethyl Phthalate (.c.)	lb.	.27½	.30¼
Dimethyl Sebacate	lb.	1.25	1.27¾
Dinopol	lb.	.37¾	.38¾
Dioctyl Phthalate (dms.)	lb.	.35	.37¾
Dioctyl Sebacate (dms.)	lb.	.71	.73½
D.I.O.P. (dms.)	lb.	.36¾	.37¾
Dipolymer Oil	gal.	—	.33
Dispersing Oil No. 10	lb.	.06	.06¼
Dutrex B	lb.	.02¾	.03¾
5 and 6	lb.	.020	.031
15E	gal.	.10	.20
20, 21, 22 and 25	lb.	—	.04
Elastex 10-P	lb.	.35	.37¾
50-B	lb.	.31	.33¾
DCHP	lb.	.60	.61
Emulphor EL-719	lb.	—	.62
Estac	lb.	—	.16
Ethox (dms.)	lb.	.45¼	.45¾
Flexol B-400	lb.	.28	.30
DOP	lb.	.36¾	.37¾
TOF	lb.	.46	.48¾
3GH	lb.	.44	.46
3GO	lb.	.53	.55
4GO	lb.	.35¾	.36¾
8HP	lb.	.36	.38¾
Flexricin P-1	lb.	.34¼	.36
P-4	lb.	.33¼	.35
P-4C	lb.	.43¾	.45½
P-6	lb.	.38¼	.40
P-8	lb.	.33¾	.35
Fortex (dms.)	lb.	.12½	.14½
Galex W-100	lb.	.15½	.19¼
G. B. Light Process Oil	lb.	.025	.0325
Medium Process Oil	lb.	.03½	.04¼
G. B. Naphthenic Neutrals	gal.	.11	.18
Good-Rite GP233	lb.	.45	.47¾
GP261	lb.	.35	.37¾
Harflex 500 (dms.)	lb.	.32	.34¾
Herron-H.T.	gal.	.16	.27
Herron-Plas	lb.	—	.03¾
Herron-Wax	lb.	.05¼	.06
No. 23	lb.	.08¼	.08¾
No. 24	lb.	.07¼	.07¾
HSC No. 13	lb.	.27	.30
Hylene B	lb.	.45	.50
C	lb.	.41	.46
D	lb.	.47½	.52½
Indonex 632½ (633½, 634½, 637½)	gal.	.11	.17
Kapsol	lb.	.34	.35
Kenflex	lb.	.18	.27
Kesscoflex 101 (dms.)	lb.	—	.39
102 (dms.)	lb.	—	.32½
103 (dms.)	lb.	—	.41½
104 (dms.)	lb.	—	.48
105 (dms.)	lb.	—	.33½
105 (dms.)	lb.	—	.35½
KP 23 (dms.)	lb.	.31	.32
70 (dms.)	lb.	.37¼	.38¼
90 (dms.)	lb.	.46¾	.47¾
120 (dms.)	lb.	.52	.52½
140 (dms.)	lb.	.47¾	.48¼
201 (dms.)	lb.	.58	.59
220 (dms.)	lb.	.32¼	.33¾
555 (dms.)	lb.	.33	.33½
Kremol 40	gal.	.36	.46
50	gal.	.39	.49
Kronisol (dms.)	lb.	.35¼	.36¼
Kronitex AA (dms.)	lb.	.34¾	.35¾
I (dms.)	lb.	.34¾	.35¾
Lanolin, Tech. Anhydrous	lb.	—	.31
Lead Oleate	lb.	—	.30½
Lindol (dms.)	lb.	.36	.37
2-Mercaptoethanol (drums)	lb.	1.25	1.50
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Montan Wax, Crude	lb.	.13	.14
Monten Wax	lb.	—	.30½
Morflex	lb.	.35	.51¾
MR 2088 (dms.)	lb.	—	.19
Natac	lb.	.11¼	.12¼
Nehony Resins (dms.)	lb.	.04	.04½
Neolene 210 (t.c.)	lb.	—	.16
212 (t.c.)	lb.	—	.14
220 (t.c.)	lb.	—	.15
Nerium	lb.	—	.09
Nevillac Resins (dms.)	lb.	.31	.85
Neville Resins (dms.)	lb.	.12	.18
Nevindene Resins (dms.)	lb.	.15	.18
Nevinol (dms.)	lb.	—	.20
Nuba 1 (and 2) (dms.)	lb.	.05¾	.06¼
3X (dms.)	lb.	.07¾	.08¼
15 (and 30) Oil (dms.)	lb.	.36¼	.38
No. 480 Oil Proof Resin	lb.	—	.18

PLASTICIZERS & SOFTENERS (Cont'd)

Ohopex Q10 (dms.)	lb.	.35¾	.36¾
R9 (dms.)	lb.	.37	.37½
Opalwax	lb.	.37	.38
Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax No. 64			
White	lb.	.26	.27
Yellow	lb.	.24	.25
Palm Oil	lb.	—	.11
Paradene Resins (dms.)	lb.	.06½	.07½
Para Flux (dms.)	gal.	.1925	.2025
2016 (dms.)	gal.	.22	.23
Para Lube (t.c.l.)	lb.	.046	.048
Parmo	lb.	.06	.13¼
Pepton 22 Plasticizer	lb.	.79	.82
PG-16	lb.	.38¼	.40
Picco 10 (and 25)	lb.	—	.13½
75 (and 100)	lb.	—	.13
Piccocizer 30	lb.	—	.05½
Piccolastic A (and B, C, D, E)	lb.	.28	.29
FT, FHF and FX	lb.	—	.1815
T-135	lb.	.22¾	.23¼
Piccolyte S Resins	lb.	.18½	.20
Piccopale Resins	lb.	.12	.13½
Piccoumaron Resins	lb.	.06½	.17
Pigmentar	lb.	.0389	.0678
Pigmentaroil	lb.	.0394	.0678
Plastac M	lb.	—	.09¼
Plasticizer 2286	lb.	—	.26¼
Plasticizer ODN	lb.	.31	.37
Plasticizer SC	lb.	.49	.52
Plasticizer W-13	lb.	.37	.38¼
Plasticizer XP-3	lb.	—	.50
Plastoflex 50	lb.	.34¼	.35¼
55	lb.	.31¾	.32¾
520	lb.	.37½	.38½
VS	lb.	.38¼	.39¼
Plastogen	lb.	.07¾	.08
Plastolein 9050 (c.l.)	lb.	.56	.59
9055	lb.	.33	.38
9058	lb.	.52	.55
9250	lb.	.27	.30
9715	lb.	.35	.38
Plastone	lb.	.27	.30
Polycin 783	lb.	.29½	.30½
Polycizer 162	lb.	.37	.39¼
332	lb.	.43	.45¼
ED	lb.	—	.56¼
Polyco 438	lb.	.32	.34
Polymel C-130	lb.	.19½	.20½
D	lb.	.23½	.24½
6	lb.	.05¾	.07¾
Process Oil C-255 (c.l.)	gal.	—	.22
Propylene Stearate (dms.)	lb.	—	.32
PT 67 Light Pine Oil (dms.)	gal.	—	.60
101 Pine Tar Oil (t.c., dms)	gal.	33½	.44½
400 Pine Tar (600, 800) (t.c., dms.)	gal.	.35	.46
PX-104	lb.	.34	.42
PX-108	lb.	.38	.46
PX-208	lb.	.41½	.49
PX-404	lb.	.60	.68
Reogen	lb.	.13¼	.13½
465 Resin (dms.)	lb.	.07	.07½
Resin 731-C	cwt.	—	15.00
Resin C	lb.	.0225	.0310
Resinex	lb.	.03¼	.03¼
L-4	lb.	.02¼	.03
Rexflex	lb.	—	.15
Rosin Oil	gal.	.54	1.20
R.S.O. Softening Oil	lb.	.03	.05
Rubberol	lb.	—	.25¾
Rubtar	gal.	—	.40
Santicizer B-16	lb.	.52	.54¾
E-15	lb.	.51	.53¾
M-17	lb.	.48	.50¾
No. 107	lb.	.38¾	.39¾
No. 140	lb.	.33	.35¾
No. 141	lb.	.37	.39¾
No. 160	lb.	.31	.33¾
Sherolatum	lb.	.03½	.06
Sofroner No. 20	gal.	.09	.25
Staflex DBES	lb.	.72½	.73½
DOS	lb.	.72½	.73½
IXA	lb.	.36	.37
KA	lb.	.38¾	.39¾
Stanolind Petrolatum	lb.	.053	.089
Wax	lb.	.31	.33
Staybelite Resin (dms.)	cwt.	—	12.00
Sunny South Burgundy Pitch	lb.	.0980	.1025
Sunny South Pine Tar	lb.	.0389	.0678
Sunny South Rosin Oil	gal.	.58	.87½
Superla Wax	lb.	.34½	.44
Syncera Wax	lb.	.23	.34
Syn Tac (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16
Tar, Refined	gal.	.12	.17
K-Tarnel NR (t.c.)	lb.	—	.0851
Terpene A	gal.	—	.65
TP-90B	lb.	—	.59
TP-95	lb.	—	.65
Transphalt Resins	lb.	.02¼	.03¼
Triacetin	lb.	.34	.45
Tributyl Phosphate (dms.)	lb.	.51¾	.52¾
Tricresyl Phosphate (t.c.)	lb.	.36	.37
Turgum S	lb.	.10	.11
Vanadiset A	gal.	.13	.20
Vistac No. 1	gal.	1.00	1.21
P	lb.	.18	.18½
Vopcolene 50	lb.	—	.37

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Aroostocrat	lb.	—	.07½
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Casein	lb.	.28	.38
Emcol K-8300 (dms.)	lb.	.19	.20
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	—	.19
Karaya Gum	lb.	—	.25
Locust Bean Gum	lb.	—	.31
Prosein	lb.	.0600	.0630
Rex Compound No. 2801	lb.	—	.15
Stablex B	lb.	.50	.95
K	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4		—	.32
Armeen C	lb.	.45	.49
Mixed Crude	lb.	.17	.23
T	lb.	.30	.34
No. 517 H.B. Oil	gal.	.11½	.16½
535	gal.	.22	.27
Burco RA	lb.	.05½	.08¼
C-6 Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.25	.30
C-33	gal.	—	.21½
C-42	gal.	—	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—	4.10
Liquid 50% (t.c.)	cwt.	—	2.55
Solid 76% (c.l., dms.)	cwt.	—	3.70
Cresylic Acid (99-100%)	gal.	.90	1.23
D-4	gal.	—	.27
E-5	gal.	—	.25
Flake Calcium Chloride (77-80%)	ton	—	27.00
G. B. Reclaiming Oil	gal.	.12	.18
CD-10	gal.	.10	.16
CD-50-U	gal.	.18	.24
Gensol No. 6 (t.c.)	gal.	—	.45
Heavy Aromatic Naphtha	gal.	—	.12¾
LX-77 Reclaiming Solvent	gal.	.21	.33
LX-572 Reclaiming Oil	gal.	.27	.32
LX-777 Reclaiming Oil	gal.	.23	.33
Neo-Fat D-242	lb.	.05½	.07¾
PRR 1	gal.	.15	.35
PT 67 Light Pine Oil (dms.)	gal.	—	.60
PT101 Pine Tar Oil (t.c., dms.)	gal.	.33½	.44½
Q Oil	gal.	—	.286
Reclaiming Oil 3186 (t.c.)	gal.	.28	.38½
Reclaiming Oil 3186-G.	gal.	.25	.36½
Reclaiming Reagent No. 1431	lb.	.21	.25
R.P.A. No. 3	lb.	—	.47
RR-10	lb.	—	.36
Soda Ash (c.l., bags)	cwt.	—	1.65
Solvent 534	gal.	.20½	.26½
Solvent Oil 21	gal.	.24	.29
C-42	gal.	.23	.28
Union Solvent 4060-O	gal.	—	.184
X-1 Resinous Oil	lb.	.0210	.0275

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0740	.1225
Continental F	lb.	.0740	.1225
Croflex	lb.	.0740	.1225
Dixiedensed (and S)	lb.	.0740	.1225
HX Compact	lb.	.0740	.1225
Kosmobile (and S)	lb.	.0740	.1225
Micronex HPC	lb.	.0740	.1225
Spheron 4	lb.	.0740	.1225
Witco Disperso No. 6	lb.	.0740	.1225

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0740	.1225
Continental A	lb.	.0740	.1225
Croflex TH	lb.	.0740	.1225
Dixiedensed HM (and S-66)	lb.	.0740	.1225
Huber Arrow TX	lb.	.0740	.1225
Kosmobile HM (and S-66)	lb.	.0740	.1225
Micronex Standard	lb.	.0740	.1225
Spheron 6	lb.	.0740	.1225
Texas M	lb.	.0740	.1225
Witco Disperso No. 1	lb.	.0740	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0740	.1225
Continental AA	lb.	.0740	.1225
Croflex 77	lb.	.0740	.1225
Dixiedensed 77	lb.	.0740	.1225
Kosmobile 77	lb.	.0740	.1225
Micronex W-6	lb.	.0740	.1225
Spheron 9	lb.	.0740	.1225
Texas E	lb.	.0740	.1225
Witco Disperso No. 12	lb.	.0740	.1225
Wyex	lb.	.0740	.1225

Channel, Conductive (CC) (bags)

Continental R-40	lb.	.1800	.2400
Dixie 5 Dustless	lb.	.1200	.1900
Dixie Voltex	lb.	.2300	.3000
Kosmink Dustless	lb.	.1200	.1900
Kosmos Voltex	lb.	.2300	.3000
Spheron C	lb.	.1400	.1850
Spheron I	lb.	.1200	.1650
Spheron N	lb.	.2500	.2900
Voltex	lb.	.2300	.3000

Conductive Furnace Black (CFB) (bags)

Aromex 115	lb.	.0890	.1290
Shawinigan Acetylene Black	lb.	.1700	.2600
Vulcan C	lb.	.1100	.1530

Furnace, Fast Extruding (FEF) (bags)

Arovel	lb.	.0600	.1000
Croflex 50	lb.	.0600	.1000
Dixie 50	lb.	.0600	.1000
Kosmos 50	lb.	.0600	.1000
Philblack A	lb.	.0600	.1000
Statex M	lb.	.0600	.1000
Sterling SO	lb.	.0600	.1000

Furnace, General Purpose (GPF) (bags)

Sterling V	lb.	.0500	.0900

Furnace, High Modulus (HMF) (bags)

Collocarb	lb.	.0550	.0950
Continex HMF	lb.	.0550	.0950
Croflex 40	lb.	.0550	.0950
Dixie 40	lb.	.0550	.0950
Kosmos 40	lb.	.0550	.0950
Modulex	lb.	.0550	.0950
Statex 93	lb.	.0550	.0950
930	lb.	.0470	.0870
Sterling L	lb.	.0550	.0950
LL	lb.	.0550	.0950

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.0400	.0800
Croflex 20	lb.	.0450	.0850
Dixie 20	lb.	.0450	.0850
Essex	lb.	.0450	.0850
Furnex	lb.	.0450	.0850
Gastex	lb.	.0500	.0900
Kosmos 20	lb.	.0450	.0850
Pelletex	lb.	.0450	.0850
NS	lb.	.0450	.0850
Sterling NS	lb.	.0450	.0850
Sterling R	lb.	.0500	.0900
Sterling S	lb.	.0450	.0850

Furnace, Fine (FF) (bags)

Statex B	lb.	.0650	.1050
Sterling 99	lb.	.0650	.1050

Furnace, High Abrasion (HAF) (bags)

Aromex	lb.	.0790	.1250
115	lb.	.0790	.1190
Continex HAF	lb.	.0790	.1250
Croflex 60	lb.	.0790	.1175
Dixie 60	lb.	.0790	.1175
Kosmos 60	lb.	.0790	.1175
Philblack O	lb.	.0790	.1190
Statex R	lb.	.0790	.1250
Vulcan 3	lb.	.0790	.1220

Furnace, Super Abrasion (SAF) (bags)

Aromex 125	lb.	.1100	.1500
Dixie 70	lb.	.1100	.1550
Kosmos 70	lb.	.1100	.1550
Philblack E	lb.	.1350	.1750
Statex 125	lb.	.1100	.1550
Vulcan 9	lb.	.1350	.1780

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Philblack I	lb.	.1100	.1500
Vulcan 6	lb.	.1100	.1530

Furnace, Super Conductive (SCF) (bags)

Vulcan SC	lb.	.1800	.2230

Thermal, Fine (FT) bags)

P-33 (c.l.)	lb.	—	.0550

Thermal, Medium (MT) (bags)

Shellblack *	lb.	—	.0250
Sterling FT	lb.	—	.0550
MT (c.l.)	lb.	—	.0350
Thermax (c.l.)	lb.	—	.0350
Thermax, Stainless (c.l.)	lb.	—	.0450

REINFORCING AGENTS—SILICA

Hi-Sil	lb.	.10	.11½
C	lb.	.11	.12½
Santocel	lb.	.62	.64

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac	lb.	.40	.50
Darex Copolymer No. 3	lb.	.47	.49
X34	lb.	.42	.44
43G	lb.	.42	.44
Darex Copolymer Latex No. 3-L (and X34L)	lb.	.36½	.39
Durez 12687 (and 12707)	lb.	—	.37
Durez 13355	lb.	—	.29½
Good-Rite Resin 50	lb.	.42	.44
Hetro	lb.	.31½	.32½
Kralac A	lb.	.43	.44
Lampblack		—	.12
Marbon S and S-1	lb.	.42	.49
8000	lb.	.42	.49
Marmix	lb.	.42	.49
Pliolite Latex 150	lb.	.44	.45
Pliolite Resin-Rubber Masterbatches	lb.	.35	.50
Pliolite NR	lb.	.99	1.00
Pliolite S3, S6, and S6B	lb.	.43	.44
Polyco 220	lb.	.18¼	.19¼
Zeolex 20	ton	120.00	-140.00

RETARDERS

Dutch Boy Normasal	lb.	—	.46
ESEN	lb.	.35	.37
Harcopol 1183	lb.	.70	.74
Retarder ASA	lb.	—	.57
Retarder PD	lb.	.35	.37
Retarder W	lb.	—	.45
Retardex	lb.	.47	.50

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	38.00	40.00
Black Diamond	ton	38.00	40.00
Byerlyte	ton	47.00	54.00
Gilsonite, Selects (c.l.)	ton	37.00	38.00
Hard Hydrocarbon (dms.)	ton	46.50	48.50
Herron Flake	ton	—	45.00
Mineral Rubber, solid	ton	42.50	44.50
Pioneer	ton	35.00	46.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.29	.36
Brown	lb.	.1220	.2200
Neophax	lb.	.1570	.2680
White	lb.	.1480	.2560

Miscellaneous Rubber Substitutes

G.B. Asphaltenes	lb.	.06	.06½
Gilsowax B	lb.	.09	.11
Resin No. 1098 (drums)	lb.	—	.62
No. 1198	lb.	.46¾	.49¾

SOLVENTS

Acetone (dlvd.)	lb.	.10½	.11½
American Dipentine	gal.	.44½	.68
American Pine Oil	gal.	.75½	.95½
Amsco Lactol Spirits (t.c.)	gal.	—	.18
Naphthol Spirits	gal.	—	.18
Mineral Spirits	gal.	—	.16
Rubber Solvent (t.c.)	gal.	—	.17
Solv A (t.c.)	gal.	—	.25½
Solv A-80 (t.c.)	gal.	—	.30½
Solv B (t.c.)	gal.	—	.29
Solv B-90 (t.c.)	gal.	—	.32
Solv D (t.c.)	gal.	—	.30½
Solv E	gal.	—	.29½
Solv F	gal.	—	.30½
Solv F-80	gal.	—	.34½
Special Naphtholite (t.c.)	gal.	—	.17
Special Textile Spirits	gal.	—	.18
Super Naphtholite	gal.	—	.17
Textile Spirits (t.c.)	gal.	—	.18
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	.09¼	.10¼

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SOLVENTS (Cont'd)

Benzol 90%	gal.	—	.48
Butyl Acetate (t.c.)	lb.	.15	.16
Butyl Alcohol (t.c.)	lb.	.15	.16
Secondary (dlvd.)	lb.	.13	.14
Tertiary (dlvd.)	lb.	.14	.15
Carbon Bisulfide, Tech.	lb.	.05½	.08½
Carbon Tetrachloride	lb.	.08¾	.09¼
Cosol 1	gal.	.37	.43
Cosol 2	gal.	.42	.48
Cyclohexane	gal.	.70	.72
Cyclohexanone	lb.	.25	.27a
Diacetone, Pure (dlvd.)	lb.	.14	.15
Dichlorethyl Ether (dms.)	lb.	.13	.15
Formal (dms.)		.29¾	.31¼
Dichloropentane	lb.	.04¾	.14¾
Dicom	**gal.**	**.30**	**.42**
Halowax Oil	lb.	.28	.41
Heptanes (t.c.)	**gal.**	**.17**	**.22**
Hexalin Cyclohexanol	**lb.**	**.20**	**.22** a
Hexanes (t.c.)	**gal.**	**.17**	**.22**
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.55	.62
Ether, Ref. (dlvd.)	lb.	.07	.08
Mersol	gal.	.43	.79
Mesityl Oxide (dlvd.)	lb.	.13½	.14½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.54½	.72¼
Methyl Ethyl Ketone	lb.	.13	.14
Methyl Isobutyl Ketone (dlvd.)	lb.	.15	.16
N-5 Pentane Mix. (t.c.)	**gal.**	—	**.13½**
N-6 Hexanes (t.c.)	gal.	—	.14½
N-7 Hexanes (t.c.)	gal.	—	.13½
Penetrell	gal.	.44½	.68
Petrolene (t.c.)	**gal.**	—	**.13125**
Picolines, Alpha, Refined	lb.	.44	1.00
Mixed	lb.	—	.34
Proprietary Solvent (dms.)	gal.	.51	.72
PT 150 Pine Solvent (dms.)	gal.	—	.44
Pyridine, Refined	lb.	—	1.15
Quinoline	lb.	.60	1.45
Rubber Solvent (t.c.)	**gal.**	—	**.16**
Rubsol (t.c.)	gal.	—	.11875
Skellysolve B (Hexanes) (t.c.)	gal.	—	.158
C (Heptanes) (t.c.)	gal.	—	.151
E (Octanes) (t.c.)	gal.	—	.165
R (Solvent Naphtha)	gal.	—	.129
Solvent, Crude, Light	gal.	.19	.28
Solvesso 100 (t.c.)	**gal.**	—	**.28**
150 (t.c.)	**gal.**	—	**.28**
Sunny South Dipentine	gal.	.44¼	.68
Sunny South Pine Oil	**gal.**	**.75½**	**.95¾**
Sunray	gal.	.1140	.1600
Toluene (drums)	**gal.**	—	**.28**
Toluol (t.c.)	gal.	—	.45
Trichlorethane	lb.	.11½	.13½
Triglycol Dichloride (dms.)	lb.	.63	.64
Union Thinner 1	gal.	—	.183
3	gal.	—	.183
5	gal.	—	.173
7	gal.	—	.173
2-50-W Hi-Flash	gal.	—	.41
Xylol	gal.	—	.45

STABILIZING AGENTS (for Vinyl Resins)

Advastab No. 21	lb.	—	1.08
Barca 10	lb.	—	.80
Barium Stearate	lb.	.37	.42
Basic Silicate White Lead	lb.	.17¾	.18¾
Bunatak Polymer No. 780	lb.	—	.04
No. 5514	lb.	—	.35
BVS	lb.	—	.73¾
Cadmium Stearate	lb.	1.40	1.44
Calcium Stearate	lb.	.35	.40
Dutch Boy DS-207	lb.	—	.54
Plumb-O-Sil A	lb.	—	.29¾
B	lb.	—	.31¾
Tribase	lb.	—	.27½
Dythal	lb.	—	.41
Ferro 120 (dms.)	lb.	.73¼	.83¼
121 (dms.)	lb.	.68	.78
200 (dms.)	lb.	1.33	1.43
211 (dms.)	lb.	.65	.75
221 (dms.)	lb.	1.51	1.61
541 (dms.)	lb.	.35½	.45½
541A (dms.)	lb.	.81¾	.91¾
620 (dms.)	lb.	—	.77½
700 (dms.)	lb.	.48¾	.58¾
900 (dms.)	lb.	1.02¾	1.12¾
903 (dms.)	lb.	.65	.75
909 (dms.)	lb.	1.02¾	1.12¾
920	lb.	—	.98
931 (dms.)	lb.	.75¼	.85¼
1820 (dms.)	lb.	.90	1.00
Harshaw 1-V-3	lb.	.43	.58
1-V-4	lb.	.74	.89
2-V-4	lb.	1.19	1.29
2-V-7	lb.	1.24	1.34
2-V-8	lb.	1.44	1.59
5-V-1	lb.	.41	.56
5-V-2	lb.	.44	.59
7-V-1	lb.	.95	1.05
7-V-2	lb.	1.00	1.15
8-V-1	lb.	1.23	1.33
8-V-3	lb.	.60	.70
8-V-5	lb.	.93	1.03
9-V-1	lb.	.89	.99
9-V-2	lb.	.45	.60
12-V-5	lb.	.90	1.05
128-V-5	lb.	.86	1.01
Lead Stearate No. 102	lb.	.33	.34
Lead Stearate, Precip.	lb.	.32	.44
Fused	lb.	—	.37

STABILIZING AGENTS (Cont'd)

Lithium Stearate	lb.	.62	.67
Medicol N	lb.	.41½	.42½
S	lb.	.30⅜	.31⅜
Stabelan E	lb.	1.39	1.50
XL	lb.	.60	.70
G	lb.	.85	.95
HR	lb.	1.25	1.40
Stabilizer No. 3	lb.	—	2.05
Stabilizer No. 42	lb.	—	.85
Stabilizer No. 52	lb.	—	2.05
Stabilizer No. 89X	lb.	—	.75
Stabilizer No. 143	lb.	—	.85
Stabilizer BC-12	lb.	—	.90
Stabilizer B-5	lb.	—	.70
Sodium Silicates	cwt.	1.00	5.25
Stabilizer CH-14	lb.	—	.65
Stabilizer CH-20	lb.	—	.65
Stabilizer E6B	lb.	—	.95
Stabilizer E-49	lb.	—	.60
Stabilizer E-98	lb.	—	.55
Stabilizer G-1	lb.	1.25	1.40
Stabilizer HR	lb.	.85	.89
Stabilizer JCX	lb.	—	.63
Stabilizer L	lb.	—	.60
Stabilizer OM-10	lb.	—	2.05
Stabilizer OM-18	lb.	—	3.55
Stabilizer SN	lb.	—	.48
Stabilizer V-1-N	lb.	—	.47
Stabilizer VL-3	lb.	—	1.00
Stabilizer V-7939	**lb.**	—	**.60**
Staflex OY	lb.	—	1.20
QXMA	lb.	—	.70
Staycin 1	lb.	—	.65
Stayrite 10	lb.	.32	.37
F-10	lb.	.39	.44
15	lb.	.53	.57
20	lb.	.37	.42
22	lb.	1.40	1.44
25	lb.	.35	.40
70	lb.	—	.70
80	lb.	—	.70
90	lb.	—	.70
Vanstay L	lb.	.33	.35
H	lb.	.75	.77
H.T.	lb.	.90	.92
S	lb.	.65	.70

STIFFENING AGENTS

Calco S.A.	lb.	.85	.88

SUN CHECKING AGENTS

Allied AA-1177	lb.	.15½	.16½
Antisol	**lb.**	—	**.23**
Antisun	lb.	—	.18½
Heliozone	lb.	.26	.27
NBC	lb.	—	1.55
Sunolite	lb.	.21	.23
Sunproof 713	lb.	.25	.26
Imp.	lb.	.25	.26
Jr.	lb.	.20	.21
Tonox	lb.	.52	.54

SURACE ACTIVE AGENTS

Aquarex D	lb.	—	.78
MDL	lb.	—	.33
ME	lb.	—	.94
NS	lb.	—	.60
SMO	lb.	—	.50
WAQ	lb.	—	.25
Emulphor EL-620	lb.	—	.39½
Igepal CO-730	lb.	—	.36
CO-850	lb.	—	.38
CO-880	lb.	—	.38
Igepon CN-42	lb.	—	.25
T-77	lb.	—	.53

TACKIFIERS

Arcco 620-32B	lb.	.20	.21
716-30	lb.	.18	.19
1041-21	lb.	.16½	.17½
Galex (drums)	lb.	.15½	.19¼
Indopol H-300	gal.	1.00	1.21
Koresin	lb.	—	.95
Liquid Rubber Flux	lb.	—	.14
Nilox (c.l.)	cwt.	—	14.50
Resin V	lb.	—	.23½
Rubtack	**lb.**	—	**.12**
Synthol	lb.	—	.24¾
Tackifier 1041-21	lb.	.16½	.17½
Vistac No. 1	gal.	1.00	1.21
A	lb.	.21½	.22¼
Zirex (c.l.)	cwt.	—	14.75

THICKENERS (FOR LATEX)

Alcogum AN-6	**lb.**	—	**.05**
AN-10	**lb.**	—	**.08¼**
Betanol (drums)	**lb.**	—	**.70**
Emulsorex No. 5	**lb.**	—	**.35**
Good-Rite K-702	lb.	.34½	.35
K-704	lb.	.21	.22
K-705	lb.	.31	.32
K-707	lb.	.18	.19
K-708	lb.	.29	.30
K-710	lb.	.15	.16
Medicol VD	lb.	.13¾	.14¾
VE	lb.	.13⅜	.14⅜
Polyco 296 BT	lb.	.15	.16
296-N	lb.	.15	.16
530	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.67
Sodium Silicates	cwt.	1.00	5.25

VULCANIZING AGENTS

Selenium

Vandex	lb.	—	4.75

Sulfur

Blackbird (c.l.)	cwt.	—	2.85
Cloud	cwt.	—	3.00
Crystex	lb.	.19½	.23
Darex Dispersed Sulfur	lb.	.14	.16
Devil A (c.l.)	cwt.	—	2.40
Dispersed Sulfur	lb.	.14	.16
Insoluble Sulfur 60	lb.	12½	.13
Ko-Blend IS	lb.	—	.38½
Mist (Wettable)	cwt.	—	4.00
Spider	cwt.	—	3.00
Star (c.l.)	cwt.	—	3.25
Sulfasan R	lb.	—	1.50
Tire (c.l.)	cwt.	—	2.40
Tube	cwt.	—	3.25
Vultac 2	lb.	.47	.74
3	lb.	.51	.78

Tellurium

Telloy	lb.	—	2.50

WETTING AGENTS

Advawet No. 10	lb.	—	.20
No. 33	lb.	—	.48
Aerosol 18	lb.	—	.40
AY	lb.	1.00	1.25
MA	lb.	1.00	1.25
OT 70% Clear	lb.	.80	1.00
OT 100%	lb.	1.00	1.50
Alrosol (dms.)	**lb.**	—	**.40**
Alrosperse	**lb.**	—	**.18**
Areskap 50	lb.	.30	.38
Dry 100	lb.	.60	.72
Aresket 240	lb.	.30	.38
Dry 300	lb.	.60	.72
Aresklene 375	lb.	.42	.57
Armacs	lb.	.29	.76
Arquads	**lb.**	**.21**	**.61**
Emcol 5100 (dms.)	lb.	—	.37
5130 (dms.)	lb.	—	.40
Etho-chemicals	lb.	.34	.80
Kessco E-122 (dms.)	lb.	—	.49
Kreelon 4G (bags)	lb.	.132	.155
8G (dms.)	lb.	.28	.30
Lecithin	lb.	.13	.17
Modicol N	lb.	.41½	.42½
S	lb.	.30⅜	.31⅜
Orvus Extra Granules	lb.	.15	.16
Nekal NS	lb.	—	.28
Nopco 1086-A	lb.	.39½	.40½
1187-X	lb.	.15	.16
Parnol	lb.	.13	.18
Pluronic L-62	lb.	.38½	.42½
Selapon Gel	lb.	—	.13
Santomerse D	lb.	.44	.65
S	lb.	.13	.25
Sorapon SF-73	lb.	—	.18
SF-78	lb.	—	.30
SF Conc.	lb.	.29	.30
Sorbit P	lb.	—	.25
Stablex G	lb.	.50	.70
Tergitol 4 (dms., dlvd.)	lb.	.30	.31
7 (dms., dlvd.)	lb.	.43	.44
O8 (dms., dlvd.)	lb.	.30	.31
P28 (dms., dlvd.)	lb.	.18½	.19
Trenamine W-30	lb.	—	.15
Vultamol	lb.	—	.17½
Wetsit Conc.	lb.	.25	.28

MISCELLANEOUS CHEMICALS

Aquarex G	lb.	—	.21
Aquasperse 30	lb.	—	.11
Arccopel W-18	lb.	—	.18
Copper Inhibitor X-872-L	lb.	—	2.01
D-Tac	lb.	—	.22
2-Ethylhexanol	lb.	.27¾	.29¾
Fura-Tone Resin 1226	lb.	.41	.43
Gen-Tac Resin	lb.	—	.42
MODX	lb.	.29½	.34½
Nullapon BF-12	lb.	—	.20½
BF-13	lb.	—	.26½
BF-78	lb.	—	.61½
Para Resin 2457	lb.	.04	.04¼
2702	lb.	.04	.04¼
2718	lb.	.04	.04¼
Pigmented Filmite (dlvd.)	lb.	—	.16¾
Resorcin, Tech.	lb.	.77½	.78½
Rio Resin	lb.	.60	.62
Rongalite CX	lb.	—	.24
Sherosope F	lb.	.17	.17¼
F-445	lb.	.17	.17¼
L	lb.	.18	.18¼
N	lb.	.18	.18¼
T	lb.	.18	.18¼
Sublac Resin PX-5	lb.	.23½	.24½
Sulfasan R	lb.	—	1.50
Synpep	lb.	.54	.60
Thiokol LP-2	lb.	.96	1.06
LP-3	lb.	.96	1.06
Tysonite	lb.	.24	.24¾
Vanfre	gal.	2.50	3.00

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All Classifications (except Positions Wanted):
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Copy for January, 1954, issue, must be received by Monday, January 4th

POSITIONS WANTED

SUPERINTENDENT OF PRODUCTION desires new connections. Capable as Technical Director or Production Manager for mechanical rubber goods and sponge rubber products. My knowledge of the industry is practical and technical. University educated. Address Box 818-P, RUBBER AGE.

LATEX CHEMIST, over 12 years in responsible position. Compounding, dipping and coating. Special interest in research and development work. Address Box 815-P, RUBBER AGE.

EXECUTIVE RUBBER ENGINEER-CHEMIST. Several years top-level experience in plant management, research and development, compounding, technical service, and production of mechanical molded and extruded goods. PhD in chemistry. Available immediately for administrative position in either Laboratory or production. Knows plastics. Minimum salary $10,000.00. Address Box 819-P, RUBBER AGE.

LATEX CHEMIST—Experienced in laboratory development, sales service and production of natural and synthetic latex as applied in the textile field. Can relocate and will accept foreign employment. College graduate. Address Box 811-P, RUBBER AGE.

GENERAL MANAGER-PLANT MANAGER. Graduate chemical engineer with 10 years management and 16 years technical-compounding experience in mechanical goods is interested in a change which offers top management opportunities. Reliable, responsible, and experienced in all phases of plant management, industrial relations, etc. Address Box 817-P, RUBBER AGE.

Experienced in small business management, sales and broad technical work. Specialized in large and small plant product development, production problems, etc., primarily rubber field. Age 39. Prefer warm climate, foreign considered. Address Box 820-P, RUBBER AGE.

HELP WANTED

CHEMIST — CHEMICAL ENGINEERS
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EMPLOYMENT COUNCIL, INC.
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WANTED—TAPE CHEMIST or ENGINEER. Opportunity for research and development supervisor for new plant in south. Give full information in first letter in own handwriting. Address Box 810-W, RUBBER AGE.

CHEMICAL ENGINEER—openings available for young men who really want to grow with an expanding organization. Development work on very interesting products. Mechanical goods, all types of synthetic rubber and plastics. We want men who have had a few years well rounded experience, who have imagination and ambition. State all particulars. Enclose a picture if possible. Address Box 812-W, RUBBER AGE.

Help Wanted continued in next column→

HELP WANTED—Continued

PRODUCT DEVELOPMENT ENGINEER

Major Ohio tire manufacturer seeking outstanding engineer with definite interest in development work. Prefer young aggressive graduate with three to five years industrial experience. Applicant desired should have creative ability and capable of carrying project work to completion. This position offers qualified man exceptional opportunities. In reply state age, education, experience and salary expected. Address Box 802-W, RUBBER AGE.

LARGE RUBBER HOSE MANUFACTURER

Great Lakes Area, has excellent opportunity for young man with experience in technical and factory hose sales department of rubber goods manufacturer. Salary $4,800 to $6,000 plus moving expenses. Retirement, insurance and family hospitalization benefits. Explain qualifications fully, enclosing recent picture which will be returned; confidential. Address Box 807-W, RUBBER AGE.

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Several years' background in development and production of soling stocks. Excellent opportunity. Address Box 814-W, RUBBER AGE.

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If you are a qualified design engineer interested in development work on tire machinery and rubber processing equipment, we have an attractive position and would like to consider your application. We want a man with inventive turn of mind as the problems cover complex machinery to reduce manual operations. A real position with a real future. State age, experience and salary demand. Address Box 803-W, RUBBER AGE.

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ALL TYPES OF FACTORY WASTE FOR RECLAIMING PURPOSES
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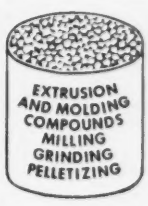

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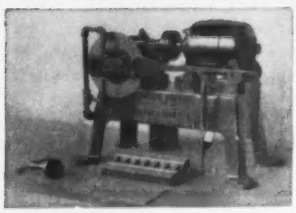

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Approximately 6,500 sq. feet or more available in Boston area. Heated, sprinklered, concrete floor, good labor supply, fluorescent lights, 220-3 phase power. Attractive proposition for progressive extruder needing low cost vinyl and polyethylene scrap. Address Box 816-B, RUBBER AGE.

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EQUIPMENT WANTED

WANTED: Rubber mills, calendars, mixers, Banbury mixers, extruders, grinders, cutters, hydraulic presses, injection molding machines. Consolidated Products Co. Inc., 14-17 Park Row, New York 38, N. Y.

WANTED: Rubber machinery including Banbury mixers, heavy duty mixers, calendars, rubber rolls and mixers, extruders, grinders and cutters, hydraulic equipment, rotary and vacuum shelf dryers, injection molding machines. Will consider now operating or shut down plant. P. O. Box 1351, Church Street Station, New York 8, N. Y.

WANTED: Used Mechanical Convection Laboratory Oven of approximate inside dimensions, 19" width, 14" depth, 19" height. Advise make, temperature range, price, etc. Also used Tensil Tester for textiles. Advise details. Address Box 804-E, RUBBER AGE.

WANTED: 500 G.P.M. Pump, electric driven, horizontal shaft for cold water at 75 P. S. I. Also 9000 or 10,000 gal. pressure tank, 100 P. S. I. test. Must be in good condition and within 500 miles. Nichols Engineering, Inc., 479 Ferry Blvd., Stratford, Conn.

Wanted by manufacturer. Used mill, good condition, approximately 18" x 50" complete with drive and motor. Within 400 miles New York. Address Box 823-E, RUBBER AGE.

Wanted by small rubber manufacturer, #2 extruder and Scott Tensile Testing Machine. Address Box 821-E, RUBBER AGE.

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1—Birdsboro, 2000 Tons, down-acting ram 34" dia. x 14" stroke, 48" DLO, 42" x 42" bed area.
1—Clearing, 500/1500 Tons, completely self-contained with controls for manual or automatic operation, suitable for compression and injection.
1—Farrel, 393 Tons, 48" x 48" steam platens, 2 openings, 4 rams—10" dia. x 24" stroke, approx. 15" per opening.
1—Watson-Stillman, 100 Tons, down-acting ram 11¼" x 9½" x 6" stroke, 22" x 20" bed, 24" DLO, self-contained, 15HP MD Vickers Pump Unit PRACTICALLY NEW.
1—Watson-Stillman, 100 Tons, 11¾" x 12" platens, 22½" DLO, ram—8" dia. x 15" stroke, complete with 3 HP MD Pump.
1—HPM, 100 Tons, 18" x 18" Platen Area, ram 8" dia. x 18" stroke, 30" DLO, Steel Cylinder—4000 PSI.
2—Burroughs, 75", down-acting, 17½" x 17" electric-heated platens, 13½" DLO, ram—8" dia. x 10" stroke, complete with 7½ HP MD Oilgear Pump.
1—HPM, 35 Tons, down-acting ram 6" dia. x 6" stroke, 15" DLO, 12" x 6" bed area, self-contained.
1—Industo Laboratory Press, 12 Tons, Hand Operated, 8" x 8" electrically heated platens, NEW.
3—Denison, 4 Tons, Model FH4-CO1, down-acting ram—3"¼ x 2" x 12" stroke, 18" DLO, bed 22" x 14", 8⅛" throat, complete with 3 HP MD Pump, time delay control, all valves, piping, gauges, controls. 1 machine slightly used, 2 units still in original crates.
1—Standard Machinery Co. #14 Toggle Press, 150 Tons, platen area 34" x 28", 6" DLO, 3½" Stroke, arranged for Motor Drive, practically new.

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